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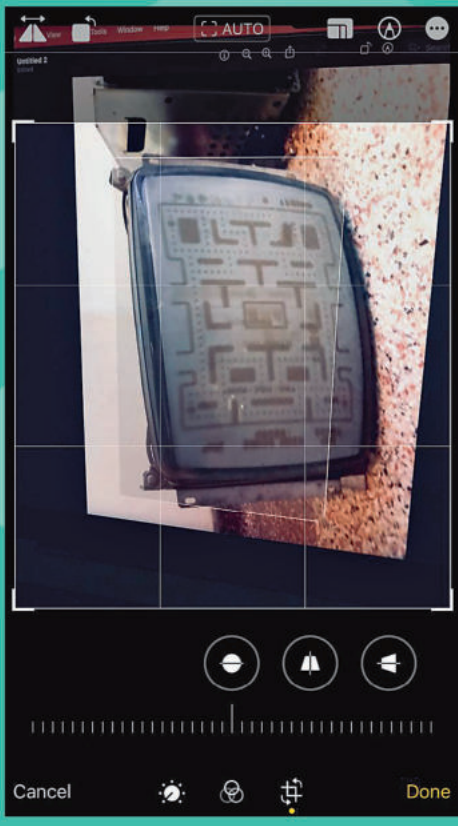
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Screen Images

In-Game Photography, Screenshot, Screencast

Edited by Winfried Gerling, Sebastian Möring and Marco De Mutiis



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Winfried Gerling, Sebastian Möring, Marco De Mutiis (ed.)

Screen Images

In-Game Photography, Screenshot, Screencast

With contributions from

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Foreword

This book takes the phenomena of screen photography, screencasts and in-game photography as its starting point and goes on to investigate their status as everyday photographical practices carried out within the digitised and digitally produced realities we inhabit, which are themselves largely mediated via screens and screen-like surfaces. The onset of the recent Covid-19 pandemic prompted an even greater turn towards screens, thereby rendering the observations made in this book all the more evident.

To this day, the practices and phenomena examined here have rarely been the subject of scientific investigation. In fact, there continues to be a noticeable dearth of aesthetical, cultural, technical and historical analyses as well as a significant lack of theories and theory production in relevant disciplines.

Screenshots are not only a form of camera-less photography; they also serve to document events that have taken place on a computer screen. Usually they are images of images (second-order images), and sometimes they are images that contain images. These images have the status of visual proofs; they provide evidence of glitches and disruptions, but they also document the history of computational interfaces, in-game achievements and anything that happens on the screen in general. The act of photographic capture is also simulated *within* computer games, such as via game mechanics and implemented functions, including photo-modes in which camera operations and filters are replicated on dedicated interfaces in an attempt to merge the act of playing with the act of photographing. Furthermore, photographic materials lie at the core of textures and digital 3D models that populate computer desktops as well as architectural simulations and computer game environments.

Last but not least, artistic practices and computer games offer a hybrid interplay between the camera and the screen, for example, in the act of capturing visual outputs on a computer screen by means of a real camera or using augmented-reality technology to mix the camera input with corresponding computer-generated images.

The goal of this book is to foster the development of a new line of enquiry from the perspective of media studies, media aesthetics and media history as well as from the viewpoint of image studies, photography

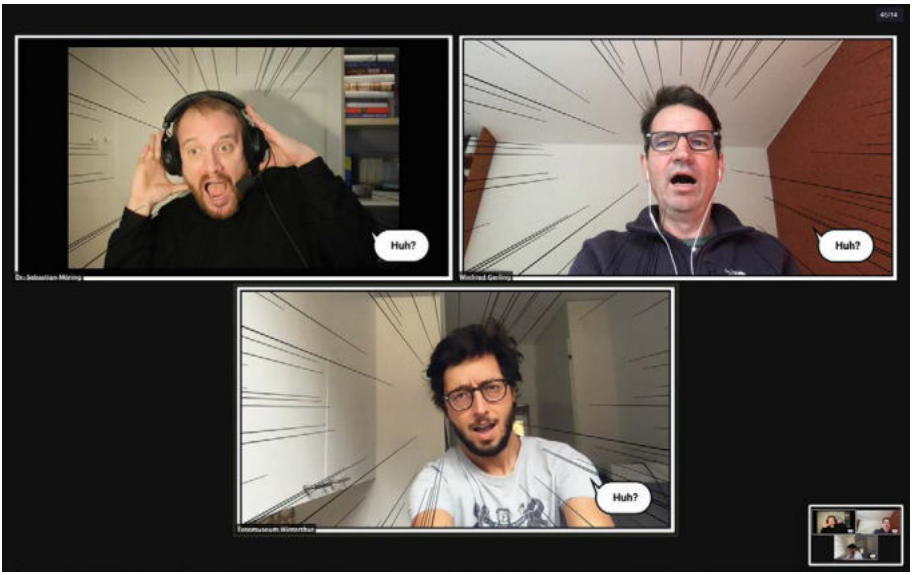
theory and game studies. Our aim is to define and describe screenshot (and screenshot-*like*) practices and phenomena, but also to ask questions regarding the status, ontology and aesthetics of such practices and phenomena as well as to explore their cultural and artistic significance. This volume investigates the potential for a new area of future research – one that stands at the intersection of a range of disciplines, including media studies, media aesthetics, media history, image studies, photography theory, game studies, media art and game art. This publication reflects on the photographic practices *of* and *within* screen images, including video games, computer desktops, crt-tubes, mobile devices and others. Indeed, be they screenshots, screen photography, virtual camera systems, photo modes, photographic game modifications or screencasts, many of these phenomena present a considerable challenge to our traditional understanding of the photographic apparatus, photographic processes, the act of capturing and photographic media in general.

We first experienced several of the phenomena examined in this book in the form of images and works of art. As we are committed to the idea that theory is driven in equal measure by text-based work and media practice, we also invited contributions in the form of artistic practice, each of which provides a unique perspective on contemporary image practices. These contributions, together with the image material quoted in the articles, make this volume a multifaceted experience for both the intellect and the eyes.

Our authors were also free to contribute short or long articles, most of which are essayistic in style. We hope this speaks to an audience with an academic and artistic background just as much as to members of the general public interested in historical and contemporary practices in visual and digital media.

This publication is the result of two workshops attended by the authors and held at the Brandenburg Centre for Media Studies (ZeM) in July 2017 and at the Lucerne University of Applied Sciences and Arts in October 2018 respectively. The genesis of the book was quite lengthy, especially as the Covid-19 pandemic broke out just weeks before we had scheduled to hold the third authors' workshop in Milan in March 2020. As one can imagine, the pandemic brought a whole new level of complexity to the publication process. We would therefore like to thank each one of the authors, artists and individuals who participated in our workshops for their enthusiasm, commitment and substantial contribution to a topic that has received little attention to date. We would also like to thank Julie Hagedorn for her careful proofreading of the texts and Lars Pinkwart for his invaluable work on the manuscript formatting.

Special thanks go to the ZeM and the Lucerne University of Applied Sciences and Arts for funding and supporting the workshops and especially to the ZeM for making this publication possible.



Winfried Gerling, Sebastian Möring and Marco De Mutiis

Introduction

The iconic and pictorial turns proclaimed in the early 1990s suggested an increasing awareness among Western cultural and media scholars that culture is, to a great extent, constituted pictorially. More than a mere recognition of the "increasing importance of visual phenomena of everyday culture", these turns represented "a new epistemological awareness of images in the study of culture".[1] Although visual media such as painting, photography and cinema had long since established themselves in the first half of the 20th century, the second half of that century saw an enormous added increase in the number of screens entering the homes and daily lives of many people. Initially, these screens appeared in the form of TVs (1950s), later as computer monitors (1980s) and more recently as touchscreens on smartphones and tablets (2000s). In particular, the growing normalisation of screen-based work (Bildschirmarbeit) and the emergence of smartphones and tablets have called increasing attention to a specific kind of image practice, namely the *screen image* in its different forms, which include photographs of screens, screenshots and even in-game photography. The images resulting from these practices are usually so inconspicuous and incidental that they are often overlooked and have, up until now, hardly been considered as constituting a category of their own.

Our aim in this introduction is to establish an effective gateway to this collected volume by paving a path through the various phenomena, technologies, histories and practices associated with screen images. On this brief journey, we will also include very brief introductions to the chapters submitted by our authors. We will begin by providing a working definition of the term *screen image* and continue by suggesting a possible mode of classifying these images, thereby drawing on many examples from the history of both screen images and in-game photography. Depending on their thematic focus, some chapters in this volume will be introduced by means of more general remarks regarding screen images, while others will be mentioned as belonging to one of the categories of

[1] Doris Bachmann-Medick: *Cultural Turns. New Orientations in the Study of Culture*, Berlin 2016, p. 245.

our classification. Since the screen image is such a rich phenomenon and still new to theoretical discourse, it simply cannot be grasped by means of texts alone. For this reason – and in order to provoke further thought on the subject – we are delighted to be able to complement the text-based chapters in this volume with 11 artistic contributions that inhabit a space between screenshot theory and screenshot practice and explore the intriguing world of in-game photography.

A working definition of screen images

In simple terms, the concept of the screen image used in this book describes the visually captured or fixed state of a constellation *on* or *in front of* a screen – no matter whether it depicts a moving image or a still image. In the context of photography research exploring the screenshot as a photographic practice, this fact has received very little to no attention so far. Screen images are not written with light; instead, electrical charges are copied, except, of course, in the case of a so-called screen-photograph (German: *Schirmbild*), which describes a photograph of the screen with a camera in front of it. Yet the photographic context is central to understanding what the screenshot means as a practice in our digital cultures.

There are many studies in cultural and media history that explore displays and / or (computer) screens[2], and most of them usually refer to the materiality of the screen (often synonymous with the screen) and its references to art (history) – whereby they also refer, time and again, to Alberti's concept of the window and Lacan's scheme of eye and gaze. In spite of these studies, however, there is still hardly any work being done on how to deal with the (photographically) captured images of these screens. Screenshots are images that scientists and academics handle every day, but the origin of these images is rarely questioned or even communicated. For their own part, in-game photographs range from an

[2] To name a few:
W. J. T. Mitchell: "Screening nature (and the nature of the screen)", in: *New Review of Film and Television Studies*, 13/3 (2015), pp. 231–246.
Jens Schröter and Tristan Thielmann: "Display I: Analog", in: *Navigationen. Zeitschrift für Medien- und Kulturwissenschaften* 6/2 (2006).
Jens Schröter and Tristan Thielmann: "Display II: Digital", in: *Navigationen. Zeitschrift für Medien- und Kulturwissenschaften* 7/2 (2007).
Lev Manovich: "An Archeology of a Computer Screen", in: *Die Zukunft des Körpers I. Kunstforum International* 132 (November 1995 – January 1996), pp. 124–135.
Erkki Huhtamo: "Screen Tests: Why Do We Need an Archaeology of the Screen?", in: *Cinema Journal* 51/2 (Winter 2012), pp. 144–148.

everyday practice to forms of artistic expression and practice.[3] And yet, only in very recent years has it been possible to observe a growing discourse on these kinds of images. Today, newspapers display screenshots just as often as they are used in scientific and academic publications. Hints like *film still* and *screenshot* implicitly point to their origin. Indeed, these are images we look *through* rather than *at*.[4] Their processuality is still so dominant – even in the form of the fixed still image – that we ignore their genesis and materiality.

Covid-19 is clearly not the sole reason for the increasing interest in screen images. However, the Corona pandemic has certainly accelerated the awareness of the phenomena and helped to shed more light on them. With the introduction of lockdowns and remote working, a hitherto unimaginable number of employees suddenly found themselves spending the entire day in front of a (computer) screen. Indeed, even their private lives were mediated by screens (smartphone, tablet and television) to an extent unheard of prior to the pandemic. These circumstances provide an outstanding breeding ground for an examination of the screen-image practices we wish to shed light on in this volume.

Screen(shot) – Development of meaning

The etymology of the screenshot is complex, since it refers, on the one hand, to the screen (French: *Écran*) and thus to a long conceptual history of the screen (Middle Dutch: *Scherm* or Old High German: *scerm*) as a canvas. On the other hand, it also refers to the shot, and here primarily to the snapshot; in the context of photography, this is the word used to describe a quick photograph, whereby it has no verb form and is referred to in German as *knipsen*[5] The meaning of the word *shot*[6] is relatively clear. It describes the act of shooting and that which is unloaded or shot out during the shot. In her chapter in this volume, Birgit Schneider takes the literal figure of *shooting a screen* as an entry point to investigate whether screenshots can reveal their own mediality and also whether there are

[3] Eron Rauch: "Virtual Light: Exploring In-Game Photography and Photo History", in: *videogametourism.at*, August 28, 2012, http://videogametourism.at/content/virtual-light-exploring-game-photography-and-photo-history (last seen: April 25, 2022).

[4] Paul Frosh: *The Poetics of Digital Media*, Cambridge / UK, Medford 2019, p. 62.

[5] See Winfried Gerling: "Knipsen", in: Heiko Christians, Matthias Bickenbach, Nikolas Wegmann (ed.): *Historisches Wörterbuch des Mediengebrauchs* Volume 2, Cologne, Weimar, Vienna 2015, pp. 412–428.

[6] (Art.) "Shot", in: *Online Etymology Dictionary*, no date, https://www.etymonline.com/word/shot (last seen: June 29, 2022).

historical precursors to screen images that suggest the concept of second-order observation.[7]

Escran is the Old French version (Northern France 8–14th century, borrowed from Middle Dutch *scherm*)[8] of the French word *écran* and describes, in the broadest sense, a material shield against heat or light.

The Brothers Grimm's *German Dictionary* attributes the following origins and meanings to the word *Schirm*: schirm, m. murus, clypeus, defensio, protectio, protector.[9]

The noun *scren* already existed in Middle English, and from the end of the 15th century onwards, the verb *to screen* was also used to indicate the "process of filtering and excluding unwanted effects".[10]

The *screen* or *Schirm* (German), to which reference is made here, is thus suitable for separating two spatial areas from one another and nevertheless connecting them through its possible transparency. From the 18th century onwards, so-called wall screens (German: *Wandschirme*) increasingly became image carriers and thus the predecessors of the screen that would go on to become a projection screen for the images of the magic lantern and early cinema. In this context, the term *screening* is still used today to refer to the showing of a film.[11] During the Second World War, the term was expanded to include the use of radar screens as performing the act of screening.[12]

It will not be possible here to delve into the long history of terms used synonymously with the *screen*, such as *Bildschirm* (German), or to explore the understanding of the term to mean protection against radiation, as a *display*, that is, as something unfolding, and as a monitor, that is, as something controlling and observing.[13] What is essential for our purposes in this volume is the etymological relationship of *screen* and

7 Birgit Schneider: "'Shoot(ing) the image' – A look at screen images from a meta-pictorial and media-archaeological perspective", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 53–76.

8 Doris Bravo: "Screen", in: *The University of Chicago – Theories of Media – Keywords Glossary*, Winter 2003, https://csmt.uchicago.edu/glossary2004/screen.htm (last seen: June 29, 2022).

9 (Art.) "Schirm", in: *Grimm online*, no date, http://woerterbuchnetz.de/DWB/, no date, (last seen: June 29, 2022).

10 Ursula Frohne and Christian Katti: "Screen", in: Jörn Schafaff, Nina Schallenberg and Tobias Vogt (ed.): *Kunst-Begriffe der Gegenwart: von Allegorie bis Zip*, Cologne 2013, p. 255–263, here p. 257, quote translated by the authors.

11 Cf. ibid: p. 257 ff.

12 Screening is also a systematic procedure for mass screening of a defined cross-section of the population.

13 For the complex history of the computer display and its related products see Tristan Thielmann: "Der einleuchtende Grund digitaler Bilder. Die Mediengeschichte und Medien-

Schirm as an object that simultaneously shields[14] and shows something, thus distinguishing two processes and two spaces.[15] An example of this can already be observed in the phantasmagorias that emerged in the 18th and 19th centuries, whereby images were projected onto a screen using rear projection in such a way that the projection apparatus (Laterna Magica) was deliberately concealed; at the same time, the origin of the image that appears is not visible, thus separating the apparatus-based production of the image – i. e., the technology – from the image itself.

Screen recordings and screenshots emerged as a result of the need to capture a moving and rapidly changing screen image directly. In this sense, it is very close to photography as a practice of recording, and perhaps photography arose from a similar need, namely the capturing of an image that is already an image before it is captured. In other words, it is possible that the matte screen of the camera obscura was the reason for a key part of photographic developments in the 19th century. Michel Frizot speaks in this context of the "copy of views in the camera obscura".[16] Indeed, as early as January 7, 1839, François Arago stated the following about the invention of the daguerreotype at a meeting of the Academy of Sciences in Paris:

> The whole world [...] knows the apparatus called Camera Obscura or Darkroom, whose invention belongs to J.-B. Porta; the whole world has noticed with what sharpness, with what truth of shape, colour and sound the external objects will be reproduced on the *matte screen* placed in the focus of the lens that constitutes the essential part of the instrument; all the world, after admiring these pictures, was moved by the regret that they could not be captured. This regret will no longer be relevant: M. Daguerre has discovered special *plates* on which the optical image leaves a perfect imprint; *plates* on which everything that surrounded the image is reproduced down to the most minute details, with incredible accuracy and fineness.[17]

praxistheorie des Displays", in: Ursula Frohne, Lilian Haberer and Annette Urban (ed.): *Display und Dispositiv: Ästhetische Ordnungen*, Paderborn 2019, p. 525–575.

14 Man's relationship to their screens changed as a result of the pandemic. The screen now also functions as a means to protect against infection. See: Olga Moskatova: "Networked Screens: Topologies of Distance and Media Regime of Immunization", in: *img journal* 2/3 (2020), pp. 282–305.

15 Perhaps two peculiarities of the early days of the computer should be mentioned here. Firstly, the ENIAC computer, whose display (10x10 pixels) showed the direct output of a calculation process as a non-readable representation of continuous symbolisations of numerical values, thus introducing the principle of individually controllable discrete light points into display development, and the Manchester Mark 1, in which modified cathode ray tubes (CRTs) actually served as displays and as main memory. ibid., p. 548.

16 Michel Frizot: *Neue Geschichte der Fotografie*, Cologne 1998, p. 21. Quote translated by the authors.

17 Original text: "Tout le monde [...] connait l'appareil d'optique appelé chambre obscure ou chambre noire, e dont l'invention appartient à J.-B. Porta; tout le monde a remarqué

The French protocol equates the matte screen of the camera obscura with the plate that records the image at the place where the matte screen is otherwise located as "écran"; this appears essential to the argument that the images were already there and admired before they were recorded, that is, before they could be recorded and the plate of the daguerreotype could take their place. This is also true for in-game photographs, which are screenshots that rely on the pre-existing image of the computer game.[18]

Henry Fox Talbot once noted the special speed with which photography was able to record an image: "[…] however numerous the objects – however complicated the arrangement – the Camera depicts them *all at once*".[19] In doing so, he also points to the instantaneous – the shot-like – nature of photography.

Still, the screenshot as a digital process is a copy of an image, a representation of digital data, not a photograph taken with a camera that reduces a three-dimensional space to two dimensions. Digital screenshots are pixel-exact positive copies (raster graphics) of the constellation of programme windows found on the respective screen – or an actively selected part of it – at the moment of the screenshot. Their edges are arbitrarily determined, and today the cursor is mostly hidden.[20] They are usually rectangular (orthogonal) and have no central perspective characteristics.

The screenshot is the capture of a temporary state in the graphical interface. This includes different concepts and visualities appearing simultaneously in screenshots: texts, images, software interfaces, 3D simulations, games etc. With its clear two-dimensionality, it is closer to the photogram as a form of camera-less photography than to photography. It

avec quelle netteté, avec quelle vérité de forme, *de couleur* et de ton, les objets extérieurs vont se reproduire sur *l'écran* place au foyer de la large lentille qui constitue la partie essentielle des cet instrument; tout le monde, après avoir admire ces images, s'est abandonné au regret qu'elles ne pussent pas être conservées. Ce regret sera désormais sans objet: M. Daguerre a découvert des *écrans* particuliers sur lesquels l'image optique laisse une empreinte parfaite ; des *écrans* où tout ce que l'image renfermait se trouve reproduit jusque dans les plus minutieux détails, avec une exactitude, avec une finesse incroyable", Dominique François Arago: " Protocol of the meeting of January 7, 1839", in: *Comptes rendus hebdomadaires des séances de l'Academie des Sciences* 8 (1839), pp. 637–668, here p. 4. Emphasis in the quote by Gerling, Möring, De Mutiis.

18 See also these chapters in this book: Cindy Poremba: "Ansel and the (T / M)aking of Amateur Game Photography", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 223–243. Sebastian Möring: "The Conditional Cyberimage – On the Role of Gameplay in Artistic In-Game Photography", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 263–282.

19 See "Plate III. Articles of China", in: Henry Fox Talbot: *The Pencil of Nature*, London 1844. Emphasis in the quote by the authors.

20 It wasn't always so. Today, the operating system allows you to set whether the cursor is displayed in the screenshot or not.

is noteworthy that some of the earliest attempts to produce photographs were designed as copies: Niepce's first heliographies consisted of contact copies of prints and texts. Talbot was also still experimenting with the direct copying[21] of printed texts and the photography of lithographs.[22] In a recent study of in-game photography, Seth Giddings has drawn similar conclusions regarding the ontological status of the in-game photograph.[23]

Much like capturing images from the camera obscura, the copy as a photographic process for the improvement and / or simplification of the printing technique stood at the beginning of the history of photography. In other words, rather than pursuing originality, one of the key goals was to achieve the ability to copy already printed pictures. This two-dimensional practice is thus very close to the pixel-identical copies of the screenshot. Like the photogram, the screenshot is an image on a scale of 1:1 and has no perspective characteristics. Unlike optical photography, the screenshot and the photogram do not show a section of potentially infinite elements; instead, they show an image of elements that are arranged in a special way towards the section, even though the chosen section can be very arbitrary.

This image is not like the image of a camera, i. e., it is not the two-dimensional section of an infinite three-dimensional space. It is not generated by a *virtual camera* and thus does not originate from an optical paradigm. It is the image of a two-dimensional space whose organisation explicitly refers to the visible section. This clearly distinguishes the screenshot from the photograph. Theoretically and arithmetically, the space behind the monitor is now infinite, and something can be shifted off-screen at any time. In the early Graphical User Interfaces (GUIs), this was not yet the case.[24] Due to memory limitations, it was impossible to move the windows over the edge of the monitor. The resulting screen photographs and screenshots were fitted into the frame of the monitor in a different way than today. They do not show a supposed detail, but consequently everything that was on the monitor, and they do not refer beyond its edge. This is figuratively also a testimony to the closed nature of earlier personal computers, which disappeared in the course of their development due to their networking. In this sense, the screenshot also documents the changes to the systems on

[21] See "Plate IX. Fac-Simile of and old Printed Page", in: Henry Fox Talbot: *The Pencil of Nature*, London 1844.

[22] See "Plate XI. Copy of a Lithographic Print", in: Henry Fox Talbot: *The Pencil of Nature*, London 1844.

[23] See also Seth Giddings: "Drawing without Light", in: Martin Lister (ed.): *The Photographic Image in Digital Culture*, Abingdon, Oxon 2013, pp. 41–55.

[24] For example in the Xerox Star (1981) or Apple Macintosh (1984).

which it can be executed, that is, from non-networked desktop computers and computers with internet access to today's mobile systems, laptops, tablets and smartphones into which this function has been integrated.

Taking a screenshot is a photographic practice that was implemented as a function in these computers in the early 1980s with the establishment of the personal or home computer. When "computers became domestic",[25] it was apparently important to be able to record what was visible on the screens. Especially when the multitasking arrangements appeared in different programme windows on the screen, and before the introduction of the screenshot, it was only possible to export image formats from one programme at a time, at least as long as it was a graphics or image editing programme and never everything that appeared on the screen.

This need to record on-screen activity was then extended to computer games. Computer games entered households and living rooms alongside televisions and computing devices ranging from gaming consoles to personal computers and have since become an indispensable part of everyday life. As a result, the practice of in-game photography has emerged and, just like real-world photography, it also ranges from an everyday practice to an acknowledged form of artistic expression.[26] Yet only in recent years can one observe a slowly growing theoretical discourse about these practices and related kinds of images.

From this point on, we develop one possible method of classifying screen images categorised according to the prepositions *on*, *in*, *though, beneath* and *in front of*.[27]

On (#materiality, #physicality):

This category contains all images / cases that consciously or unconsciously make the materiality of the screen visible. These include scratches, fingerprints, reflections and curvatures, but also the screen as an object

[25] See Sophie Ehrmanntraut: *Wie Computer heimisch wurden – Zur Diskursgeschichte des Personal Computers*, Bielefeld 2019. Quote translated by the authors.

[26] Rauch: "Virtual Light: Exploring In-Game Photography and Photo History", in: *videogame-tourism.at*, op. cit.

[27] This classification is the result of a longer work with students of the European Media Studies Program at Univeristy of Potsdam and the University of Applied Sciences Potsdam over a series of seminars whose contribution shall be acknowledged: Joana Bußmann, Malin Drosihn, Fynn Jedrysek, Sina Jurkowlaniec, Juliette Fonfara, Pia Naomie Herrmann, Isabelle Knispel, Nicole Krüger, Kira Huth, Isis-Victoria Rampf, Leni Roller, Konstanze Stoll and Rebecca Vaßen.

that stands as an object that resists the repeatedly claimed immateriality of the digital.

When in use, a screen itself, in its materiality, is rarely perceived. Instead, it acts as a window to other worlds. When the screen is turned off, it is rarely given any attention. A switched-off medium is hardly noticed, because it usually does not communicate anything. At best, it finds a temporary new usage as a black mirror. On the other hand, screens are constantly being touched and remain in close contact with the users at all times: they are carried around as smartphones, smartwatches, laptops, tablets, etc. Users also take care of their screens and have a strong affective physical relationship with them.



Fig. 1: for example: Penelope Umbrico: *TVs from Craigslist*, 2008.

Screenshots have a photographic history that goes hand in hand with the standardisation of the photographing of screens (screen photography or Bildschirmfotografie") or radiological luminous screens, the development of the so-called "Schirmbildfotografie" (screen photography).

In the context of tuberculosis screening, the Brazilian medical doctor Manuel Dias de Abreu[28] developed a standardised procedure (1936) that made the large-scale, expensive X-ray film obsolete by directly photographing the fluorescent screen of an X-ray machine using a device with an integrated 35 mm camera, thus generating only one hundredth of the

[28] Manuel Dias de Abreu (Januar 4, 1894 – January 30, 1962). This technique was then called Abreugraphy, see "Chest photofluorography", in: *Wikipedia*, no date, https://en.wikipedia.org/wiki/Chest_photofluorography (last seen: June 29, 2022).

cost of an image.[29] This represented a major step forward for the health system, as the so-called mass screening of tuberculosis became easier to implement.

"Schirmbildfotografie" (screen photography) has been developed further for various scientific visualisation techniques, e. g., for recording images of the cathode ray tube (CRT) screen of an oscilloscope or of computer monitors that function accordingly. For this purpose, separate camera types and devices were developed, which since the 1950s have primarily used the Polaroid method to obtain and archive direct recordings of the measured values. This equipment is needed because the images to be recorded cannot be reproduced or stored by the data-generating technology themselves.

What distinguishes these practices from screenshots is that they capture the front of the monitor, with its complex materiality, whether or not it comes to the fore. "Schirmbildfotografie" or "Bildschirmfotografie" (screen photography) was established to denote the photographic recording of a luminous screen, i. e., the "external" photographing of a screen with a camera, as opposed to the "internal" recording (screenshot), which is actually a storing. "Schirmbilder" (screen pictures) show the front of the device, while screenshots capture an internal process as a copy.

The photographing of computer screens began systematically in the early 1960s as a way of making the work being done on the first CAD computers visible to a wider audience. At that time, it was mainly computer scientists and developers who were using these expensive computers in a few scientific and military laboratories, where it quickly became apparent that they were going to have to find a method to make this kind of knowledge production visible and communicable. Matthew Allen describes this process as a conventionalisation of the screenshot, even though at that time it was still generated analogously with a camera in front of the screen as a screenshot.[30] Here, it becomes of utmost importance that it is clear where the images come from: "The sense of it being 'from the screen' was the most important content of the image."[31] Thus the new technology was also communicated as a new ideology. In his short intervention in this volume, Jacob Gaboury suggests that we consider early computer

[29] The first Schirmbildaufnahme (Screen Photography) was published by J. M. Bleyer in 1896. But the method was not suitable for mass investigations. See Dorothee Romberg: *Die Röntgenreihenuntersuchung (RRU) als Mittel der Tuberkuloseprävention in Deutschland nach 1945*, PhD Thesis, University of Cologne 2011, p. 30 ff.

[30] Matthew Allen: "Representing Computer-Aided Design: Screenshots and the Interactive Computer circa 1960", in: *Perspectives on Science* 24/6 (2016), pp. 637–668, here p. 656.

[31] Ibid., p. 658.

plots as precursors – but also as essential parts – of the history of visual computational output, such as screens and screenshots.[32]

The momentary state of a visual output is to be recorded as a singular, spontaneous photo-graphical recording and, if possible, not processed further, making it possible to store and permanently save the image of a temporary reality – as a document – in order to be able to archive it and communicate it to others. Screen photographs are thus strange hybrids; they create the image of a clear, two-dimensional order by means of an optical system, but their access is materially limited to the surface of the apparatus. This means that they bring the materiality of the screen to view – including curvatures, opacities, scratches and fingerprints – without pointing it out. It is noteworthy that most of these early images were chiefly recorded on Polaroid material. This was due to the fact that such an image was seen more as a copy or backup copy of the image shown on the screen – a copy that could be filed immediately – rather than some kind of photographic testimony. In fact, evidence of one of the most formative developments of the 20th century is still available today as a series of small Polaroids photographed by hand: the development of the Apple Lisa interface and the first graphical programmes like "Quick Draw" was documented by computer scientist Bill Atkinson in roughly 1979–1982.[33]

Stephan Günzel makes metaphorical use of the materiality of the screen in his chapter in this volume, ruminating on the "nature of images" while discussing different characteristics of television-screen photography.[34] Along a similar line, in his brief essay in this volume, Friedrich Tietjen focuses on two very distinct screen photographs and their roles as historical witnesses.[35] Artist Gareth Damian Martin further complicates this separation between screen and image in their project *The Continuous City*, where they take analogue photographs of screenshots taken in computer game architectural environments.[36]

[32] Jacob Gaboury: "Paper Computing and Early Screenshot Cultures", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 87–92.

[33] See Andy Hertzfeld: *Revolution in the Valley*, Sebastopol / Calif. 2005, pp. 89–97.

[34] Stephan Günzel: "Image Reflection: Television-Screen Photography", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 145–159.

[35] Friedrich Tietjen: "Documenting Witnessing: Two Cases of TV-Screen Photography", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 301–306.

[36] Gareth Damian Martin: "Pathways (Extracted from The Continuous City)", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 79–85.

In (#real / virtual, #intimacy):

This category includes all images / cases that are intended to be placed in the computer's opening to the world. It treats screenshots as a (documentary) method of appropriating the infinite worlds of images: Google StreetView, Google Earth, but also the images of computer games generated from their special relationship to reality. It also addresses the individuality of what appears on the screen through the personalised interfaces of programmes and desktops. As such, it also addresses the intimacy that can be generated through the individual use of these surfaces. The screen is a strange object somewhere between public (show) and private (close). It is a place of unconscious negotiation between these zones.



Fig. 2: for example: Jon Rafman: *Nine Eyes of Google Street-View*, 2008 – ongoing.

Photographer Roc Herms reveals the interwoven boundaries between the two spheres in his ongoing public screenshot diary *Hacer Pantallazo*, constantly unfolding with live uploads from his screens.[37] Kent Sheely acts as a photo-reporter in the multiplayer sandbox game *Garry's Mod*, capturing the most absurd player interactions, while also remixing them

[37] Roc Herms: "Hacer Pantallazo", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 295–299.

to represent the artist's personal experience.[38] The tension between private and public spheres is also at the core of Emily Wick's series *Blind Spots*, in which she uses screenshots to document CCTV camera feeds available online, thereby revealing the blind spots of public networked surveillance and the paradoxical relation between the monitor and the monitored.[39]

If, at the beginning of the history of interactive computers, the image of the screen was always shown in the context of its use as a way of testifying that these devices existed and that they enabled important and new processes, this process was completed in the early 1980s with the introduction of the PC. The first-ever entry of the term "screenshot" in the Oxford Dictionary in 1983 and its integration into the operating system of the Apple Macintosh in 1984 also provide evidence of this.[40]

In the course of the development of the personal computer in the mid-1980s, the digital screenshot function was implemented in various operating systems. Whatever is concretely being executed in the computer differs depending on the platform. Simply put, it can be assumed that the screenshot is written from Video RAM into memory or immediately as a file (format) with corresponding metadata[41] on a data storage device. It is not a specifically rendered image, but rather a copy of the image currently generated in the computer that produces a certain form of evidence, including juridical evidence.

These are images of layers of windows[42] (programmes), of the realities on the computer, but also images that allow insights into the private sphere of users. These are images of a surface rather than of an operative image (interface).[43] They are correspondences of what was on the screen, similar to whatever was on a piece of paper when making a photogram or copy. They are shadows of a functional relationship that is erased at the moment of the shot. The index of the operative image points to some-

[38] Kent Sheely: "The Swamp", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 215–220; *Garry's Mod* (2006), Valve Corporation, MS Windows; *Garry's Mod* (2006), Valve Corporation, MS Windows.

[39] Emily Wick: "Blind Spots", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 309–315.

[40] Until today it is the same keyboard command that triggers the screenshot. "Cmd-shift-3"

[41] These metadata are enlightening when they acquire meaning in forensic or juridical contexts. The metadata of a screenshot refers to internal states of a computer, while the metadata of a camera refers to camera settings, hardware used and, under certain circumstances, to the place where the image was created.

[42] See Margarete Pratschke: "Jockeying Windows – Die bildräumlichen Strukturen grafischer Benutzeroberflächen als visuelle Grundlage von Multitasking", in: Winfried Gerling / NGBK (ed.): *Multitasking. Synchronität als kulturelle Praxis*, Berlin 2007, p. 16–24.

[43] For the distinction between surface and interface see Branden Hookway: *Interface*, Cambridge / Mass. 2014, p. 4.

thing different than a screenshot of the same screen constellation; while the symbols, icons and menus, etc., always refer to operations available in the computer, the screenshot refers to the use of the computer, the culture with it, to intimacy, etc.

The difference between these two images – which appear so confusingly similar – lies in the decision to create a screenshot. In our image culture, it is otherwise impossible to create the image of an object or situation that is like it. As Philippe Dubois noted: "With the photographic index, the sign is never the thing. Even in the photogram, where the real object is spatially closest to its image, since it is literally placed on the light-sensitive paper, this extreme proximity is never an identification".[44] The screenshot is first understood as a reality, as "it was" on the screen of my computer (pixel identical). It is a strange confusion with reality, which could never occur in a photograph.[45]

Indeed, it is possible that the screenshot is the only image of an object that can be confused with that object, at least for a short time. Deprived of the operativity of the interface image, the screenshot is like a photogram, but more like a shadow or the back of the image.[46] This becomes particularly clear when a person tries to operate in the screenshot as they would in the interface.[47]

In this sense, the screenshot is perhaps the best example of what Charles Sanders Peirce called "similes" in his theory of signs and of what is repeatedly cited in the context of the indexicality of photographs, namely that they correspond "point by point to" the original.[48]

The screenshot thus has a different reference than digital photographs, which use a sensor to convert reflected light into measured values that can potentially be stored as charges. In the screenshot, there is a transfer

[44] Philippe, Dubois: *Der fotografische Akt. Versuch über ein theoretisches Dispositiv*, Amsterdam, Dresden 1998, pp. 92, 257. Quote translated by the authors.

[45] Only in its beginnings is it confused with nature and otherwise always understood as representation. See Steffen Siegel: "Fotografische Detailbetrachtung: analog / digital", in: Marcel Finke and Mark A. Halawa (ed.): *Materialität und Bildlichkeit. Visuelle Artefakte zwischen Aisthesis und Semiosis*, Berlin 2013, pp. 143–160, here p. 149.

[46] "So the photogram teaches us in a certain way to see with the eyes of the photographic paper, and it gives us to see all objects from behind or from below. Perhaps the photogram is one of the few successful attempts to look at the world from the thing side. To be seen with thing eyes." Ulrich Raulff: "Ein Etwas oder ein Nichts", in: Floris M. Neusüss and Renate Heyne (ed.): *Das Fotogramm in der Kunst des 20. Jahrhunderts. Die andere Seite der Bilder – Fotografie ohne Kamera*, Cologne 1990 [1985], pp. 406–410, here p. 409. Quote translated by the authors.

[47] This is particularly irritating on the smartphone, where a screenshot is often accidentally created, which then fills the display and strangely enough cannot be operated.

[48] Charles Sanders Peirce: *Semiotische Schriften*, Vol. I, Frankfurt am Main 2000 [1893], pp. 191–201.

of charges that are identical to what was in the graphics processor. This is the peculiarity of these pictures. They are pixel-identical copies of the pictorial reality that was shown on the computer.

The "decisive moment" is therefore the moment in which the image is detached from the monitor. From out of a process of fluid charges, a permanent charge is generated in the accumulator, in this case as a latent image.

Paul Frosh has worked out the existential aspect of the testimony of the screenshot in the context of digitally mediated information and communication:

> Capturing and witnessing [...], the screenshot shows us that social media and mobile communication technologies have become so intimately intertwined with our existence that they are far more than new infrastructures for circulating messages or managing social relationships.[49]

In his chapter in this volume, Frosh takes this aspect as a starting point.[50] Instead of following the common argument that photography is eminent in cultural memory, he holds, inversely, that the cultural memory of photography makes it possible to expand photography into the realm of digital devices, such as smartphones, tablets and computers. By subtly juxtaposing the screenshot of an internet video and a photograph taken by the artist at the same location from the identical point of view, Michael Schäfer creates images that highlight the specificities of both media, thereby allowing the screenshot's relationship with the media event being witnessed to emerge.[51]

As has been shown, the opportunities to take screenshots are so varied that they can only be reproduced incompletely here. Screenshots serve the spontaneous recording and communication of many things, including the following: recipes, instructions, tutorials, topographic notes (maps and paths), quick programme exports (communication aids), agreements, error messages (debugging), settings in booking systems, receipts of the transmission of consumption data (gas, water, electricity), decision shifts, signatures / references / libraries, visual quotations, scientific documentations, interesting image excerpts, film quotations (YouTube / Vimeo), mistakes, documentation of long-distance relationships

[49] Frosh: *The Poetics of Digital Media*, op. cit., p. 91.

[50] Paul Frosh: "Screenshots and the Memory of Photography", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 173–190.

[51] Michael Schäfer: "Three Probes into Recent History", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 137–143.

(video chats), visual gags, reinsurance and legal safeguards, wish lists, scores, successes, glitches, system messages, trophies, new purchases in computer games, etc.

Screenshots stage, curate, arrange and document digitally mediated content. They often serve as a basis for further processing (memes) and influencing (fakes). The functions of screenshots are essentially to act as visual notes, reminders, communication aids, inspirations, idea collections, archiving and evidence. The latter is best exemplified in the political context of the circulation of networked images in Winnie Soon's *Unerasable Images*, as well as in the screenshots of Azahara Cerezo, which act as proof of political graffiti in her work *Paisajes Digitales de una Guerra*.[52]

Screenshots play a particular role in digitally created realities. Indeed, screenshots are particularly suited to capturing states of moving 3D simulation. This plays a role in the context of architecture simulations,[53] but also especially in the constantly changing environments of computer games. The possibility to capture a certain game state as a screenshot already existed with the introduction of this function in the operating system. These screenshots always contain the interface of the respective game and tend to reference or document a culture of playing rather than prioritise any form of photographic expression. The history of photographic recording in computer games begins with the possibility of recording played games by means of a virtual camera as simulated photography.[54] Since many games are played from a first-person perspective and thus the image to be played appears as an image from a virtual camera of this perspective, the generation of the game scene is already subject to a photographic paradigm. It follows the laws of central perspective. In games, therefore, shooting and photography have an indistinguishable perspective.

[52] Winnie Soon: "Unerasable Images", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 43–50; Azahara Cerezo: "Paisajes Digitales de una Guerra", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 169–171.

[53] On this aspect: Matthew Allen: "The Screenshot Aesthetic", in: *MOS: Selected Works*, Princeton 2016.

[54] First developed by players as a modification of the game Doom, in order to be able to follow the course of the game from the perspective of the players and also distribute it for training purposes. See Lowood: "High-performance play: The making of machinima", in: *Journal of Media Practice* 7/1 (July 2006), pp. 25–42. Out of these possibilities the machinima culture develops, which records choreographed scenes with the game engine as film-like projects in order to share them with others. This functionality is adopted by the industry as an extension of the game concept, so that the recording of the game also allows the selection of camera positions and different optics.

Photorealism[55] is the declared goal of virtual realities that got their start with the history of the flight simulator.[56] This is a realism that aims to create images that are indistinguishable from photographs, which includes simulating certain analogue photographic effects, such as lens flare, geometric distortion, motion blur, etc.[57] Confusing these in-game photos with reality is different from confusing the screenshot with the interface. The confusion here lies on the level of simulation, namely a double simulation: as photography simulates a view of the world, in-game photography already simulates a simulation.[58]

Through (#processuality, #performativity, #fake):

This category includes all pictures / cases that are captured by users and then influenced intentionally or unconsciously.

If certain contents – be they images or texts – are conveyed through the screen, the screen itself becomes the medium. *Through the screen* can be understood as a process of information transmission in the sense of a movement into and out of the screen.

At the same time, this implies the possibility of an action, a performative act through which something can be affected or even changed in a manipulative fashion.

The practices of screenshot and photography in computer games must therefore be distinguished in their application and function. The screenshot is used to a greater extent in service of the spontaneous recording or documentation of a temporary state of the game (for a variety of reasons), the recording of the setting in the programme, evidence of a glitch, a score, etc. It is also used to point out deficiencies in the sys-

55 See Lev Manovich: "Die Paradoxien der digitalen Fotografie", in: Hubertus von Amelunxen, Stefan Iglhaut and Florian Rötzer (ed.): *Fotografie nach der Fotografie*, Dresden, Basel 1995, pp. 58–66, here p. 64.

56 Jens Schröter: "Virtuelle Kamera. Zum Fortbestand fotografischer Medien in computergenerierten Bildern", in: *Fotogeschichte* 23/88 (2003), pp. 3–16, here pp. 4–5.

57 See Konrad F. Karner: *Assessing the Realism of Local and Global Illumination Models*, Vienna, Munich 1996, p. 10. Barbara Flückiger: "Zur Konjunktur der analogen Störung im digitalen Bild", in: Jens Schröter and Alexander Böhnke (ed.): *Analog / Digital – Opposition oder Kontinuum? Zur Theorie und Geschichte einer Unterscheidung*, Bielefeld 2004, pp. 407–429. Markus Rautzenberg: "Exzessive Bildlichkeit. Das digitale Bild als Vomitiv", in Ingeborg Reichle, Steffen Siegel and Achim Spelten (ed.): *Maßlose Bilder. Visuelle Ästhetik der Transgression*, München 2009, pp. 263–278, here pp. 266–267.

58 See Stefan Meier: "Die Simulation von Fotografie", in: Marcel Finke and Mark A. Halawa (ed.): *Materialität und Bildlichkeit. Visuelle Artefakte zwischen Aisthesis und Semiosis*, Berlin 2013, pp. 126–143.



Fig. 3: for example: Russian Ministry Defense: Screenshot to prove the USA's co-operation with the IS. However, the picture is from a video game. The gameplay video, left, the Russian version, right.

tem. Artist Alan Butler re-enacts Ed Ruscha's seminal 1968 photo book *Nine Swimming Pools and a Broken Glass*, appropriating images from the game Grand Theft Auto V in his project of the same title.[59] COLL.EO's series *Upscaling to Remain the Same* shows the artist duo moving the game camera away from the road and the goal of winning the racing game Forza Horizon 2 to instead document the construction of the simulated world.[60] Photographing with simulated camera technology in a computer game[61] is motivated more by a photographic activity,[62] the capture of a special motif, a situation or scene in its photographic perfection.[63] With this motivation, photographing with so-called photo

59 Alan Butler: "Nine Swimming Pools and a Broken Glass", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 285–287 ; *Grand Theft Auto V* (2013), Rockstar Games, PlayStation 3.

60 COLL.EO: "Upscaling to Remain the Same", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 193–198; *Forza Horizon 2* (2014), Microsoft Studios, Xbox 360.

61 Sebastian Möring and Marco De Mutiis describe the different categories of photography in computer games as follows: (a) simulated photography central to the gameplay condition, (b) an additional photo mode, (c) artistic screenshotting, and (d) creative photographic interventions made possible by photo modifications." Sebastian Möring and Marco De Mutiis: "Camera Ludica: Reflections on Photography in Video Games", in: Michael Fuchs and Jeff Thoss (ed.): *Intermedia Games – Games Inter Media: Video Games and Intermediality*, New York 2019, pp. 69–94, here p. 74.

62 All types of photographic motif conventions are tested: landscape, portrait, architecture, erotic / pornographic, conceptual and documentary photography, etc. Again and again, photographers are interested in remote, run-down and destroyed places in play and ruin aesthetics. Mathias Fuchs: "Ruinensehnsucht – Longing for Decay in Computer Games", in: *DiGRA/FDG '16 – Proceedings of the First International Joint Conference of DiGRA and FDG*, Vol. 13, Nr. 1 (2016), pp. 1–12.

63 See in detail on this aspect Winfried Gerling: "Photography in the Digital. Screenshot and In-Game Photography", in: *Photographies* 11/2–3 (2018), pp. 149–167, here p. 156 ff.

modes is no longer a "transformative playing"[64] and takes leave of the screenshot. The current boom in computer game photography started from the screenshot, but it shows an image generated by the computer – the game engine – and no longer the image of the screen. All references to the screen become invisible.

In the context of social media, the screenshot – regardless if taken on the desktop surface of a personal computer or a computer game – is currently experiencing a boom. This draws attention to its function as a provider of evidence and documentation.[65] Many social media posts are designed to disappear, be deleted and modified, and many are not primarily supposed to be stored or made public in the first place, such as in Snapchat, Telegram and WhatsApp. Today, however, these media have become a key part of social and political communication and thus our reality. In this respect, screenshots will always play an important role in documenting what has been said, shown or done and may be withdrawn from access shortly afterwards. Some of these posts then become media events in their own right thanks to screenshots used as a form of quote. In turn, it is possible for these screenshots to circulate like photographs in media in print media, television and on the internet, where they are no longer addressed as posts in the respective platform.[66] This always entails a question of credibility, since the respective quotation is difficult to validate and can possibly only be verified with the help of other forms of testimony.

The screen*cast* has established itself as a further development of the screenshot. Screencasts makes it possible to record moving screen images on computers and is especially used for instructional videos featuring audio commentary, but also to circumvent legal or technical restrictions that arise when downloading videos.[67] To date, a number of desktop documentaries[68] and desktop movies have also been made – mostly in the

64 An activity not laid down in the rules of the game, which is a creative and reflective appropriation of the game. See Katie Salen and Eric Zimmerman: *Rules of Play: Game Design Fundamentals*, Cambridge / Mass. 2003, p. 305.

65 On this aspect see Frosh: *The Poetics of Digital Media*, op. cit., pp. 62–92.

66 In the recent past, for example, the screenshot from the WhatsApp group of a police student from Saxony, who was supposed to witness the right-wing extremist tendency of his fellow students. See for example: Laura Heyer: "Rassismus-Vorwürfe: Ex-Auszubildender packt über die Polizei in Sachsen aus", in: www.stern.de, October 25, 2018, https://www.stern.de/neon/wilde-welt/gesellschaft/rassismusvorwuerfe--ex-azubi-erhebt-schwere-anschuldigungen-gegen-die-saechsische-polizei-8414500.html (last seen: February 20, 2020).

67 The Apple DVD Player still prevents the screenshot of a picture from a movie.

68 One of the most interesting protagonists of the genre Kevin B. Lee has described his documentary *Transformers: The Premake* (Kevin B. Lee, USA 2015) like this.

horror genre. These films take advantage of the irritation you feel when you recognise that the surface of a (your) computer is being moved by someone else's hand. This effect is especially *shocking* when these films are viewed on the surface of one's own laptop, where this potentially *hostile* takeover is particularly evident as a threat. Sven von Reden has described this perspective of the audience as follows:

> What is interesting is that the desktop films are told completely from the subjective – a narrative perspective that was previously considered difficult to maintain in the cinema. Here it becomes possible with the help of the computer as a kind of extended and multiplied eye. The viewer may identify less with the protagonist and more generally with the familiar role of the computer user.[69]

Often these films break the illusion of being a pure recording of the screen image by zooming in on the interface or making other movements that are not actually possible on the desktop. While the image makes a relatively consistent effort not to leave the simulated surface, on the level of sound, it is not exclusively based on what the computer generates internally. Often the typing of the user is audible or other tones that do not sonify the inside view of the computer: "A beyond of the desktop sounds there, on which everything else should concentrate."[70]

Two chapters in this volume expand extensively on the topic of screencasts and / or screen movies: Jan Distelmeyer proposes we consider screenshots, desktop movies and related genres as relevant objects for interface studies, and Julia Eckel investigates the extent to which screencasts help document the interactivity of digital environments.[71]

While desktop movies may break the illusion of showing the original desktop by adding visual effects through post-processing, different techniques of in-game photography aim to enhance the illusion by creating more-than-hyper-realistic images.[72] One such technique was invented by Duncan Harris; under the label of *Deadendthrills*, he produces astonishing

[69] Sven von Reden: "Der Verlust der physischen Realität", in: Dennis Vetter (ed.): *Verband der deutschen Filmkritik e.V.*, https://www.vdfk.de/der-verlust-der-physischen-realitaet-682 (last seen: June 29, 2022). Quote translated by the authors.

[70] Jan Distelmeyer: "Durch und über Computer: Desktop-Filme", in: Martin Doll (ed.): *Cutting Edge! Aktuelle Positionen der Filmmontage*, Berlin 2019, pp. 193–210, here p. 193. Quote translated by the authors.

[71] Jan Distelmeyer: "A case for interface studies: from screenshots to desktop / screen films", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 317–331. Julia Eckel: "Screencasting: Documenting Processuality", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 341–370.

[72] Commonly the graphic style of photorealistic computer games is already named hyper-realistic. So to describe these techniques there still needs to be room for an increase.

in-game photographs by using high-end hardware and maxing out the graphics specifications to a level where the production of one in-game photograph may come at the price of a melted graphics card. Another technique comes in the form of the game-photography tool NVIDIA Ansel which, among many other things, allows users to enhance image resolution to create more-than-hyper-realistic images of selected computer games (whose graphics style is already considered hyper-realistic). The resulting images can show much more than can actually be seen when looking at the same scene in-game. Game graphics are usually optimised to cater to a seamless gameplay experience. Assuming that "our understanding of photography is assembled from a network of detached practices, histories and epistemologies", Cindy Poremba, in their essay in this volume, takes NVIDIA Ansel as a starting point to examine the "materiality [...], discourse [...], and images [...] surrounding NVIDIA Ansel."[73]

Beneath (#technology, #disruption, #glitch, #asymmetry(ofpower)):

This category deals with images that arise when the "medium shows itself in error" or when it is made visible by means of its own non-functioning.

The technological processes involved in visual representations usually hide behind screens, interfaces and operating systems. Their job is to make sure everything works. And as long as everything works, no attention is paid to them. These processes are as invisible as possible to users and are usually made inaccessible.

In this case, then, it is a matter of exhibiting the *non*-functioning, pointing out ways of deceiving the functionalities, of provoking them intentionally, and thus also reducing the signal-to-noise ratio, pointing to it.

For example, this category might depict people who are involved – mostly unnoticed – in the functioning of the digital, as Benjamin Shaykin does, for example, in his project *Google Hands*. Shaykin collects images of scans featuring the hands of GoogleBooks ScanOps; these are hands that have accidentally ended up in Google's databases in the process of scanning books. Thus they provide evidence of one of the many forms of precarious labour that, like Amazon's mechanical Turks, perform digital

[73] Poremba: "Ansel and the (T / M)aking of Amateur Game Photography", in: Gerling, Möring and De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, op. cit., pp. 223–243.



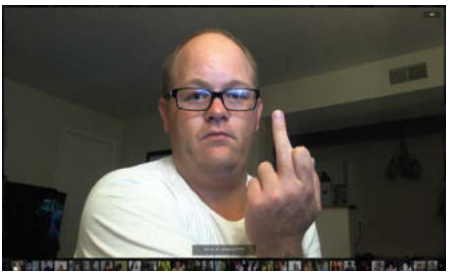


Fig. 4: Benjamin Shaykin: *Google Hands*, 2009. | Fig. 5: Guido Segni: *The Middlefinger Response*, 2013.

value creation in the service of Big Tech companies.[74] Guido Segni's *The Middle Finger Response* (2013)[75] shows crowd workers from all over the world united in a gesture, thereby giving a human face to those who, like the ScanOps, operate the *human artificial intelligence*. With a similar intent of lifting the curtain behind the scenes, Mario Santamaria's screenshot works unveil the apparatus behind Google Art Project and Google Street View, as Katrina Sluis demonstrates in her short essay in this volume.[76] In his project *Salty Glitches*, Till Rückwart appropriates satellite imagery from Google Earth to focus on glitch-filled pictures of the salt deserts of South America. While they appear colourful and mesmerizing, these screenshots reveal the complex imaging technologies used to carry out the surveillance of Earth, and they also problematise the relationship between truth and digital media through the error.[77]

Just like in every other form of computational process, glitches may occur in the course of computer gameplay. In her project *The Edge of the World*, Natalie Maximova documents the landscapes of *Cyberpunk 2077*

74 Ulrike Bergermann: "Web-Extra. Digitus", in: *Zeitschrift für Medienwissenschaft*, September 26, 2016, https://zfmedienwissenschaft.de/node/943 (last seen: March 6, 2022).

75 "The Middle Finger Response is a curated selection of 300+ spontaneous self portraits of cloud workers I commissioned travelling around one of the most representative crowdsourcing platform: Amazon Mechanical Turk. All the workers in the selection have been paid about 0.5$ in order to take a webcam picture of themselves showing their face, their context and, ultimately, their middle finger response. It's just a cynical but sincere attempt to establish a dialogue between the artist, the public and the crowd dispersed through the new frontiers of leisure, labour and exploitation in the age of the big cloud." Guido Segni: *The Middle Finger Response*, 2013, http://www.crowdworkersoftheworldunite.com/ (last seen March 6, 2022).

76 Katrina Sluis: "The Phantom of the Mirror: The screenshots of Mario Santamaría", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 289–293.

77 Till Rückwart: "Salty Glitches", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 333–339.

and the glitches that overran the game, creating a sublime virtual nature.[78] Glitches are often so ephemeral that they disappear quicker than any ability to document them in the form of a screenshot. Nevertheless, glitches and glitch-like aesthetics are a popular motif in in-game photography. The work *Hotel* (2010) from the series *Flying and Floating* by Robert Overweg shows a hotel from the game Mafia II from a point of view that players are not supposed to take, as it reveals that the textures of the hotel are only visible from the front view and appear transparent from the back.[79] This, however, is due to the way the game-world is modelled. It is not a glitch resulting from a processing error. *Glitch-hug* (2010–2011) by the same artist shows two characters from the game Left 4 Dead 2 hugging each other in mid-air.[80] This motif from the series *Glitches* (2010–2011) may, on the other hand, have resulted from a processing error. In his work, it is Overweg's decided goal "to look behind the curtain of the virtual facade and show it to the world".[81] This strategy, on the one hand, aims to make visible the technology and techniques games are made of. On the other hand, it is also a form of emancipation from the authority of the game.

In his chapter in this volume, Sebastian Möring examines Overweg's work as a means to propose the term "conditional cyberimage", a new kind of image that is the condition of possibility for in-game photography.[82]

Like Overweg, Marco De Mutiis is interested in the underlying workings of computer games. In his essay in this volume, he discusses examples of photography simulation in many computer games and problematises their implied tendencies to formalise aesthetics by posing the question: Is it possible to win at photography?[83]

78 Natalie Maximova: "The Edge of the World", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 245–251; *Cyberpunk 2077* (2020), CD Projekt, MS Windows.

79 *Mafia II* (2010), 2K Games, MS Windows.

80 *Left 4 Dead 2* (2009), Valve Corporation, MS Windows.

81 Robert Overweg: "Glitches", in: *Shot By Robert*, 2010, https://www.shotbyrobert.com/glitches (last seen: April 26, 2022).

82 Sebastian Möring: "The Conditional Cyberimage – On the Role of Gameplay in Artistic In-Game Photography", in: Gerling, Möring and De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, op. cit. pp. 263–282.

83 Marco De Mutiis: "How to Win at Photography – How Games Teach Us to See", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 253–262.



Fig. 6: Robert Overweg: *Hotel* from the series *Flying and Floating*, 2010.



Fig. 7: Robert Overweg: *Glitch-hug* from the series *Glitches*, 2010–2011.

In front of (#spatiality, #corporeality):

This category includes all pictures / cases in which people are seen behaving towards the screen.

People sit in front of the screen or mirror themselves in it. They look for the right position to see something on the screen when the sun is dazzling; they rotate their smartphones to mirror themselves or adopt a typical hand-arm-head position to shoot the perfect selfie; they swipe or scroll their fingers across the screen to read; they bind themselves to the screen, act on it and adapt to its conditions.

The interaction between human beings and the screen arises from the fact that humans must arrange themselves in front of screens in order to be let in. The screen immerses and abducts us into a world that cannot be entered physically. It binds us and our bodies to a certain position and, at the same time, makes us mentally block out our own physicality.



Fig. 8: for example: Donna Stevens: *Idiot Box*, 2015.

The image on the screen suggests that users can exercise power over the image and intervene in the surface. At the same time, however, the screen exerts power on users by reminding them of their insurmountable physicality – or by making them forget it altogether. It is a play between activeness and passiveness, between effecting and being affected, between empowering and disempowerment. The relationship between users and their screens is also a sign of intimacy caused by the very individual physical and spatial relationship to the respective screen.

This intimacy resulting from the play of activeness and passivity, empowering and disempowering, has been the subject of numerous photographic works by gamers, including the classic *Shooter* from 2000 by Beate Geissler and Oliver Sann, *Gamers* by Phillip Toledano from 2002 and *No Sleep Before I Die* by Sibylle Fendt from 2005. What these works have in common is that they show the faces of game players who are in the process of playing. The games they are playing, however, remain hidden. Thus the expressions of their faces are encoded windows into what is happening on their screens. Viewers may have an idea what it is these people are looking at, but they will never ultimately know. This void is all too often easily filled with the most common gamer clichés.

In his chapter in this volume, Winfried Gerling delivers a photo essay on the diverse and exciting phenomenology of people in front of the screen, covering historical as well as contemporary examples and eventually taking a closer look at different configurations of people looking at screens

in work contexts.[84] Depending on the point of view, each "in-front-of" can also be a "behind". In each case, both categories describe a relation between the body and the screen.

Rowan Lear takes the perceptual phenomenon of oscillopsia as a central motif in order to describe the different relations between bodies and screens, cameras and computer games.[85] The rollercoaster ride of associations in this chapter enables its readers to relate even more to the feeling described.

In her contribution to this volume, Joanna Zylinska argues that the practice of screenshotting in computer games foregrounds human perception.[86] It enables players to understand perception and vision as distributed phenomena that involve the whole body while also retraining them to see the world differently. This is reminiscent of De Mutiis' contribution in this volume; however, while De Mutiis focuses on the role of the game mechanics, Zylinska underlines the part played by the human body in the process of teaching new ways to see and perceive.

Outlook

With the popularisation of smartphones, the screenshot has taken a new turn: smartphones are small, powerful and networked computers that can also make phone calls. A wide range of sensory technologies are integrated into them, whereby the light-sensitive photo sensor experiences the most attentive use of these technologies. In this respect, smartphones combine technologies that are fundamental to the outlook presented here. Their use leads to new hybrid forms of screenshots and screen images. With a simple combination of keys, a screenshot can be created, just like on a conventional computer. In the communication between two smartphone owners, however, a new-old practice can consistently be observed, namely photographing the display on the phone of the other user. Indeed, it is often faster to take a photo than to send a message or screenshot. To save an address from a chat history, simply

84 Winfried Gerling: "In-front-of-the-screen images – A photo essay", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 93–134.

85 Rowan Lear: "Everything starts to shake: gameplay, shutter lag and fugitivity", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 161–166.

86 Joanna Zylinska: "Screen cuts: training perception beyond 'the eye'", in: Winfried Gerling, Sebastian Möring and Marco De Mutiis (ed.): *Screen Images – In-Game Photography, Screenshot, Screencast*, Berlin 2022, pp. 201–213.



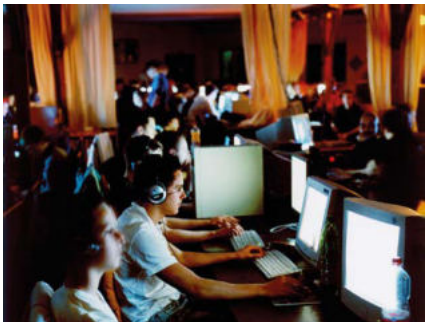


Fig. 11: Phillip Toledano: *Gamers*, 2002. | Fig. 12: Sibylle Fendt: *No Sleep Before I Die*, 2005.

take a digital photo; this, like the screenshot, often replaces the written note. In this case, however, intimacy and / or privacy and publicity – which always collide on these surfaces – are mixed in interesting ways. At the moment when a private message is observed or secured by another party, it becomes part of a public communication. In this way, things often get communicated that were not intended to be shared: for example, your grandmother's telephone number, your own whereabouts and similar forms of private information.

In the full knowledge that the categorisation presented here is just one way of mapping the vibrant field of screen images – and especially since the field itself never stops changing and developing further, even as we write this introduction – we nevertheless hope that it invites and perhaps even provokes others to propose their own classifications and thus to help extend the theoretical and artistic research being done in this area.

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Unerasable Images

Winnie Soon

The artwork *Unerasable Images* presents screenshots from Google Image Search results for the search term "六四" ("64"), a reference to the date of the student-led Tiananmen Square Protest in Beijing in 1989. The most iconic image of that day depicts an unidentified protestor referred to as 'Tank Man' facing down a column of advancing tanks. This photograph is routinely censored by authorities and blocked from any search results in China. In 2013, a Lego reconstruction of the Tank Man image started circulating before it, too, was quickly erased. Nevertheless, the image was later found beyond China, and it occasionally appears in the first few rows of a Google image search.

With more than 300 screenshots taken in 2017, this project aims to create a temporal and empty networked space where the thumbnail image(s) move within the hidden infrastructural grid and beyond the screenshot's frame, thereby examining the geopolitics of data circulation, internet censorship and the materiality of image (re)production through a complex entanglement of human and nonhuman parameters.

Search

67%

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NEW
Sign in
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六四 - Google Search

https://www.google.dk/search?q=六四&biw=1213&bih=694&source=lnms&tbm=isch&sa=X&sqi=2&v 67% Search

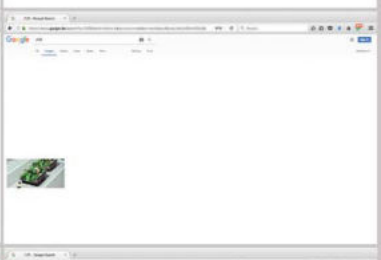
Google 六四

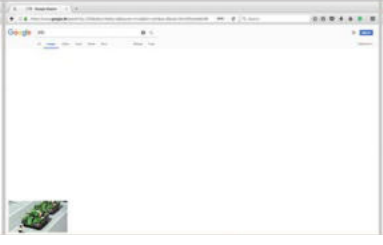
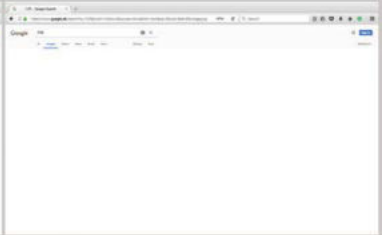
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六四 - Google 搜尋
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ved=0ahUk
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安全搜尋

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"Shoot(ing) the Image" – A Look at Screen Images from a Meta-Pictorial and Media-Archaeological Perspective

Birgit Schneider

> The use of reason makes things transparent to the mind. We do not, however, see what is transparent. We see that which is opaque through the transparent, the opaque which was hidden when the transparent was not transparent. We see either the dust on the window or the view beyond the window, but never the window itself. Cleaning off the dust only serves to make the view visible.
>
> Simone Weil [1]

Images showing images, cameras filming cameras, screens appearing on screens: in the early days of what came to be known as "video art", artists had already started exploring the meta-mediality of screens from a number of different angles. Indeed, in many works of video art about video art, artists explored the conditions of perception and illusion associated with various media, concentrating above all on reversing the one-dimensional structure of TV-watching in an attempt to trigger a break in the extant illusion.

One example of this direction in video art is a series of short films called *TV Interruptions* created by British artist David Hall (1937–2014) in the early 1970s. As part of the Edinburgh Festival in 1971, a Scottish TV channel broadcast these ten roughly three-minute *interventions* multiple times over the course of the day during the breaks between TV shows. Hall also went on to exhibit seven of the works under the title *TV Interruptions: 7 TV Pieces* at a number of museums.[2]

Hall's films play with the structural mediality of the television set as a "box", "frame" and "TV cabinet."[3] In his *Interruption Piece* sequence, for example, viewers watching on their home televisions were shown a wooden cabinet with an integrated TV on fire in the middle of a field.

1 Simone Weil: *Gravity and Grace*, Lincoln 1997, p. 186.

2 These works by Hall consisted of "Interruption Piece", 2'36"; "Window Piece", 2'41"; "Tap Piece", 3'46"; "Time-lapse Piece", 3'43"; "Pans Piece", 2'50"; "TV Shoot-out Piece", 2'58"; and "Two Figures Piece", 3'27". They were later shown in museums on a simultaneous loop on seven video columns.

3 For over one hundred years before the advent of flatscreens, TV screens consisted of a cathode ray tube enclosed in a veneered, box-like encasement that was often made of wood.



Fig. 1: David Hall: *Shoot-out Piece*, 1971.

The screen being filmed, however, was merely an empty frame; in other words, what viewers were seeing within the frame was not the image of the TV, but rather the image of the landscape behind the television set up in that very same landscape. After a couple of seconds, viewers then see a black screen and hear a voice utter the word "interruption". In *Time-lapse Piece*, television viewers' own viewing situation is repeated back to them, as they find themselves looking at the backs of the heads of other people sitting on seats watching television.

In Hall's *Shoot-out Piece*, camera teams filming near a busy street film other camera teams filming near the same busy street (Fig. 1). All of the teams are filming a TV cabinet that has been set up on what appears to be a parking area on the median between the two lanes of the busy street. At one point, a man opens the doors of the TV cabinet – in the same way one would open the doors of a puppet theatre – and soon thereafter we see that the frame of the TV screen is entirely empty, just as in *Interruption Piece*. In other words, once again, viewers are shown a TV cabinet with nothing in it. Later, a cameraman positions himself on one side of the cabinet in such a way that he and his camera can be seen filming back at viewers through the empty frame of the TV, as if he were aiming a pistol directly at the audience. After that, a slow zoom shot brings the filmed TV cabinet into alignment with the viewers' own TV format; this causes the urban environment surrounding the cameraman to disappear until the point where only the frame of the filmed TV – with

the cameraman still in it, filming back at the audience – appears on viewers' own TV sets.

In Hall's *Tap Piece*, the mediality of the screen is likened to an aquarium. Viewers watch as bubbling and rushing water begins to fill the glass screen of their TV sets. The water comes from a tap, which can also be seen in the image, and the tap continues to run even after it itself becomes submerged under water. Ultimately, the water drains back down, once again to the sound of loud gurgling noises; this time, however, the water level is tilted on a slant.

Alongside the work of other prominent video artists, such as Nam June Paik (1932–2006), Hall's short films broke new conceptual ground in the art of television interruption – a theoretical approach that made disruption its central point of reference.[4] Indeed, Hall's *Interruptions* implemented the idea of the perception of a perception, or what cyberneticist and philosopher Heinz von Foerster called second-order observation. For these ten short films to have their desired impact, it was essential that the TV station broadcast them without any additional explanation. This allowed them to disrupt the standard manner in which audiences consumed TV shows at the time, thereby prompting viewers to reflect on the one-way direction of their own TV-watching.

Interruptions and disruptions are tried-and-true tools used in media theory to convey the mediality of a medium as a format. For example, Marshall McLuhan emphasised that "the content of any medium blinds

[4] See Dieter Daniels: "Fernsehen – Kunst oder Antikunst? Konflikte und Kooperationen zwischen Avantgarde und Massenmedium in den 1960er / 1970er Jahren", available online at Medienkunstnetz, http://www.medienkunstnetz.de/themen/medienkunst_im_ueberblick/massenmedien/scroll/ (last seen: Nov. 29, 2021). See also the London Video Access compilation: "A History Of British Video Art: The First Ten Years. 1971–81 LVA VHS": https://www.youtube.com/watch?v=MrCWOYtkxCE (last seen: Nov. 29, 2021). Stephen Partridge's *Monitor 1*, 1975, shows TV screens, mise en abyme, etc.; Pete Anderson's *Eye Bath*, 1977, shows an eye filling the entire screen, and when it blinks, the surface of the screen ripples like the surface of water, and at the end, first the eye becomes blurred, then the screen itself. Tamara Krikorian's *Vanitas*, 1977, shows a half-portrait of a woman sitting in front of a round mirror with her gaze directed left. In the mirror, we see a fruit bowl, a burning candle and a television going back and forth between showing news presenters and a documentary on Flemish vanitas paintings of the 17th century, whereby the painting of a women holding a mirror, in particular, is being discussed. Marceline Mori, *2nd and 3rd Identity*, 1977, Tina Keane, *The Swing / Alice through Reflection*, 1978. Dieter Daniels described similar works: *Reverse Television*, Bill Viola 1983. One of Nam June Paik's most famous video pieces, *TV Buddha* from 1974, also allowed viewers to grasp this constellation. The work consists of a Buddha sculpture and a small television placed on a table opposite from one another. A video camera is set up that allows the Buddha to look at his own recorded-on-video image on the screen opposite from him. Past and present meet one aother, a Oriental God looks at himself through Western media. The work illustrates the special gaze that is caught in the loop of infinite reaction. In this case, it is a gaze without any other content than the gaze itself.

us to the character of the medium", but also that "the 'content' of any medium is always another medium".[5] Philosopher Sybille Krämer applied this dilemma of perception to the metaphor of the window: "Media are like window panes: the more transparent they are, the better they are at doing their job, that is, the more inconspicuously they remain below the threshold of our attention. Only when they are noisy, when their smooth service is disturbed or breaks down, do media call attention to themselves. An undistorted message, on the other hand, renders the medium almost entirely invisible".[6] Simone Weil defined the dilemma of perception in such a general way that it revealed the basic epistemological situation that forms the basis of each and every perception; indeed, the aesthesis is always dependent upon a medium. As Weil notes, this situation, in turn, has an impact on our powers of reason: "We see either the dust on the window or the view beyond the window, but never the window itself".[7] This is where those famous reversible figures – those neither-nor images and multi-stabile perception situations that can be found in all representational media – come to the fore. The most well-known example of this situation is the duck-rabbit head used by Ludwig Wittgenstein to examine changes in aspect perception: this ambiguous and multi-stabile image epitomises the impossibility of being able to perceive the rabbit and the duck at the same time. Instead, the mind inevitably races from one way of looking at the image to the other. Similarly, when we apply this concept to Hall's work, we are obliged to conclude that it is impossible for us to simultaneously conceive of our own screen and the screen being filmed, even if we are looking at both of them at the same time.[8]

At this point, the first question that emerges is whether or not the figure of a screenshot or *Bildschirmbild* (literally an "image of an image screen", that is, an image showing the contents displayed on a screen) renders its medium visible in a similar fashion, and also whether the screenshot sets the medium into an ambiguous, reversible motion that does not remain fixed. The second question that emerges is to what extent screenshots

5 Marshall McLuhan: *Understanding Media*, New York 1964, pp. 10–11.

6 Sybille Krämer: "Das Medium als Spur und als Apparat", in: Sybille Krämer (ed.): *Media, Computer, Realität. Wirklichkeitsvorstellungen und Neue Media*, Frankfurt am Main 1998, pp. 73–94, here p. 74.

7 Simone Weil: *Gravity and Grace*, p. 186. One could also add cracks in the window pane as things capable of rendering the pane visible.

8 See Birgit Schneider: "Operationalität und Optimieren", in: Birgit Schneider, Jan Wöpking and Christoph Ernst (ed.): *Diagrammatik. Ein interdisziplinärer historischer Reader*, Berlin 2016, pp. 181–187; and W.J.T. Mitchell: *Picture Theory. Essays on Verbal and Visual Representation*, Chicago 1994, specifically the chapter "Metapictures" on dialectical images, p. 186 et seq.

in general reveal the character of their medium and whether they have any actual historical precedents.

In the first section of this paper, I will sketch out the general figure of the *mise en abyme* in art history as a theoretical reflection of an image philosophy that takes place inside the image itself. In the second section, I will elucidate the historical precedents associated with a media-based archaeology of the screenshot. In the third and final section, I will examine the connection between shooting, screens and photography, with a particular emphasis on how these three are arranged in the concept of the screenshot.

Ultimately, this paper will argue that the general figure of the image-within-an-image came into being long before the idea of second-order cybernetics. I will suggest that it emerged at the same time as the genesis of image media, including painting and mirrors, as a way of capturing the experience of doubling by means of pictorial perception duplicates. Among the authors who have already undertaken important theoretical work in this realm are W.J.T. Mitchell (metaimages), Lev Manovich (screen archaeology) and Susan Sonntag (shooting images).

Image theory in the image itself

Self-referentiality is an image characteristic that was used to a considerable degree in the art of the modern era. Indeed, examples drawn from the history of art can serve as pictorial and historical anchors when attempting to further conceptualise screen images, which themselves can be characterised as being self-referential. In an essay written in 1994, the art historian W.J.T. Mitchell used the terms "metapictures" and "metapaintings" to describe self-referential images. According to Mitchell, the unique aspect of such images is that "they stage the 'self-knowledge' of pictures".[9] Mitchell sought to comprehend these images in the larger context of the history of images that theoretically and pictorially enable viewers to experience the act of representation, namely "pictures that are used to show what a picture is" and "pictures about pictures".[10] According to Mitchell, such images are able to contain other images in two structurally different ways: either by nesting themselves in images

[9] W.J.T. Mitchell: *Picture Theory. Essays on Verbal and Visual Representation*, 1994, op. cit., p. 48.

[10] See Mitchell's chapter on "Metapictures" in ibid.

in a visible way or by referring to other images outside of themselves. Mitchell sees both types of images as second-order images.

Mitchell explores an entire series of images drawn from different contexts and centuries – including cartoons, paintings and diagrams – in order to illustrate the ability of images to reveal image theory by visual means "in actu". He uses the term "hypericons" to describe the images that reveal to us the very conditions involved in recognising and knowing images: "The metapicture is a piece of moveable cultural apparatus, one which may serve a marginal role as illustrative device or a central role as a kind of summary image, what I have called a 'hypericon' that encapsulates an entire episteme, a theory of knowledge."[11] Images such as these have the ability to convey meanings not only in two directions – that is, dialectically in a back-and-forth motion – but also in more than two directions.

In order to illustrate this multiple-reference structure of metaimages, Mitchell draws on the example of Diego Velázquez's well-known painting *Las Meninas* (1656). In his work *Order of Things,* Michel Foucault had also undertaken a detailed analysis of this painting, as it offers the viewer "the entire cycle of representation".[12] Using a strategically placed mirror, Velasquez expanded the space of the image so that the mirrored reflection of the royal couple – who are not seen in the actual setting of the image – can still be seen in the panel painting, watching the painter as he paints and observing the entire scene. The mirror hangs on the opposite wall, situated front and centre, also facing the viewer. Indeed, a person standing in front of the painting therefore sees not only the final image, but also the unique case of an image coming into being on mirrors and paintings; in keeping with the optical laws of painting, however, these mirrors and paintings do not show their own mirror image, but instead show the painted mirror image of two people apparently fixed in their own standpoint outside the realm of the canvas. In this situation, the question as to which image is being painted by the painter – whose canvas we only see from behind – is never actually resolved.

Each image area or *screen* in this painting depicts a reality that appears to be fixed as if by some magic hand. In turn, the painted mirror-images – that is, the king and queen – reflect aesthetically the idea of eyewitnesses who are forever embedded in the image structure. This idea transfers the witnesses themselves into the image; indeed, in reality, viewers standing in front of the image would be the ones actually seeing themselves in the

[11] Ibid., p. 49.
[12] Quote taken from Mitchell, ibid., p. 62.

painted mirror. In other words, painted mirrors illustrate the impossible process of pictorial semiosis, a special kind of simulacrum in which the position of the referent in the triadic relationship of the sign is obscured. The image layout, which is enclosed within itself, develops a complex interplay between the layers of reality associated with a painted reality and a virtual reality, whereby both spaces are transferred onto a single image plane.

The basic technique of placing the copy of an image into the image itself sheds light on the culture of the copy and the illusion; it also helps to link the art history of painting to modern reproduction technologies and ultimately to screens. What is important here is the boundary-setting function of the frame of the image; this frame helps to draw a clear distinction between the image and the separate reality outside the frame. Interestingly, in contrast to TV screens, the possibility of presenting other frames within the frame of the screen on computer screens ultimately became a very normal condition thanks to the *Windows* operating system.[13]

Still, the mirror and the image-within-an-image are only two of the many ways developed by painters seeking to make it possible for viewers to experience the unique mediality and illusory power of images. Among the other motifs used in art are different types of trompe-l'œil, such as painted curtains covering the image, ceiling paintings in which the painted figures take on the form of sculptures, those deceptively real-looking flies that appear to be sitting not on the painted fruit but on the canvas of the still-life, and those paintings that extend out beyond the image, for example, the breaking-out-of-the-frame in Pere Borrell del Caso's *Escaping criticism* (1874). There are also allegorical depictions of a type of spiralling gaze-constellation, such as in the case of Narcissus, who is often shown as being deeply entranced by his own mirror image, as if he'd fallen into an abyss or an endless loop. All of these images embody metaimages that reveal their own mediality to viewers.

Mise en abyme – "Placed into abyss"

Mise en abyme is a term drawn from the field of heraldry and literally translates as "placed into abyss". It is used to describe a particular type

[13] This story is traced by Margarete Pratschke, for example, in: "Interaktion mit Bildern. Digitale Bildgeschichte am Beispiel grafischer Benutzeroferflächen", in: Horst Bredekamp, Birgit Schneider, Vera Dünke (ed.): *Das Technische Bild. Kompendium zu einer Stilgeschichte wissenschaftlicher Bilder*, Berlin 2008, pp. 68–81.

of image layout that contains a copy of the image within itself, sometimes in a manner that suggests an infinitely recurring sequence, such as the self-reflection between two mirroring surfaces. In this case, in contrast to the examples mentioned thus far, an image is repeated in itself over and over again in a reduced form, much like a Russian Matryoshka doll. The literary scholar Werner Wolf has differentiated the one-time mise en abyme from the frequent, never-ending mise en abyme in the realm of narrative structures, and these characteristics can also be applied to images.[14]

The mechanism of feedback is found in many forms in the history of media, ranging from the poetological element of a text containing itself all the way to the droning hum or piercing sound of microphone feedback. In the realm of visual culture, this "abyss" came to be known as the Droste Effect and was associated with a particular printed image, namely the design of a can of cocoa powder from 1904. The tin of *Droste's Cocoa* shows a nurse carrying a serving tray bearing a cup of hot chocolate next to a tin with the very same image as on the first tin. Although we cannot actually see the abyss, we sense the beginning of an endless spiral, much like the never-ending staircase in the famous image by Escher.

Even though this particular name for a mise en abyme was drawn from a tin of cocoa powder manufactured in the early era of colonial goods, it is very likely that the notion of an "abyss" was first experienced many years before, e. g., when someone placed two mirrors opposite each other; perhaps in Ancient Greece, which already had small hand mirrors, or in Versailles, where the Hall of Mirrors displayed the effect of a parallel reflection of sun rays in a much larger style. The mirror cabinets put on display at countless festivals and annual fairs most likely multiplied this experience in all directions. Today, we can experience the Droste Effect in many different situations, especially when we share or stream our own screens live via teleconferencing and forget to shut off the teleconference window. All of these examples reveal the spiral-staircase figure of the feedback loop; in this case, a never-ending reproduction of screens.

The image theory that unfolds in such figures alludes to self-reference – that is, to the experience of recursive loops and feedback loops – but also to interferences. In turn, the mise en abyme provides a tangible experience of infinity, emptiness, endless spiral and ultimately of free fall.

[14] Werner Wolf: "Mise en Abyme", in: Ansgar Nünning (ed.): *Metzler-Lexikon Literatur- und Kulturtheorie. Ansätze – Personen – Grundbegriffe,* Stuttgart 2004. See also: Werner Wolf: *Metareference across Media: Theory and Case Studies*, Amsterdam 2009.

Interwoven screens

Even before the advent of the built-in screenshot functionality of the computer age, there were digital images that contained an image of themselves in the sense of a second order. This is true particularly in the field of weaving, and especially in early weaving using punched cards. In 1844, a portrait titled *Visite de Mgr le Duc D'Aumale à la Croix-Rousse, dans l'atelier de M. Carquillat* was woven in silk by the Lyon-based master weaver Carquillat. He created the silk image as a means to commemorate an historical event, namely the visit of a high-ranking statesman to his workshop – a visit that held great symbolic importance for weavers at the time.[15] In this case, an image placed inside the image becomes key (Fig. 2). In the scene, it appears as if the visitors have just entered the room as the latest reproduction of a woven silk is being cut by the punched-card loom. The men hold in their hands the famous woven silk portrait of Joseph Marie Jacquard – the celebrated *inventor* of the loom – that Carquillat had completed only a few years earlier. Behind and above the group of visitors we see a traditional silk loom with the newly invented punched-card mechanism attached to it. The system involved several thousand cards that were punched in order to produce this fine silk portrait, which also simulates a copper engraving.

Even though the work is not depicting an identical image within the image, a complex reference structure is nevertheless created here. This configuration contains the two different structures distinguished by Mitchell, namely the visible nesting of an image within itself and its reference to something outside of itself. For the Jacquard portrait, the master weaver used an image technique that sought to forever link the inventor of the technique with his invention by means of the medium itself. In this case, the silk portrait forms part of an image that also depicts the conditions of image production without which both images would not have been able to exist in the first place.

[15] The visit took place shortly after the uprising of the Lyon weavers in the 1830s. A number of high-ranking individuals accompany the "Duc". Carquillat, the weaver, is standing on the other side of the room, and behind him the mayor of Lyon points proudly to Carquillat. At the back of the image, we see Carquillat's wife and child as well as an acquaintance. For a more in-depth look at the subject, see Birgit Schneider: *Textiles Prozessieren. Eine Mediengeschichte der Lochkartenweberei*, Berlin 2007.

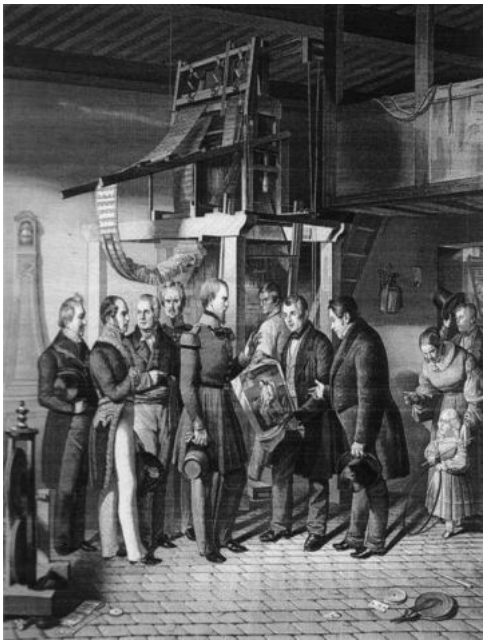


Fig. 2: Carquillat: Visite de Mgr le Duc D'Aumale à la Croix-Rousse, dans l'atelier de M. Carquillat, Lyon 1844, silk fabric.

Screen typologies

Today, the word most often used to describe a picture taken of a screen is a "screenshot" or, in German, *Bildschirmbild*. The process of taking a screenshot can be defined as "the act of making a copy of what is on the screen at the time the copy was made" or "capturing an image that was already an image before it was taken". In addition, screenshots are "usually rectangular (orthogonal) and have no central-perspective characteristics", as Winfried Gerling describes them in his essay on the cultural technology of "screenshotting" in the *Historisches Wörterbuch des Mediengebrauchs*.[16] Screen media are similar to blackboards in that they are constantly being filled and refilled with content – that is, the image content is never lastingly inscribed into the screen, as is the case with traditional painting – which meant that screens were, for a long time, depicted by means of photogra-

[16] Winfried Gerling: "Screenshotten", in: Heiko Christians, Matthias Bickenbach and Nikolaus Wegmann (ed.): *Historisches Wörterbuch des Mediengebrauchs Band 3*, manuscript edition, forthcoming, Cologne 2022.

phy. The camera perspective involved in a screenshot is usually a straight frontal one, and only rarely are screens photographed from an angle. While these characteristics are also shared by the images-within-images that have been the subject of this paper so far, there is one key difference to note at this point: screenshots do not open up an abyss and are usually not *hypericons* or *metaimages* like those in *Las Meninas* and the Droste Effect. Indeed, the fact that screenshots, too, are second-order images has been mostly overlooked in the course of the normalisation of their usage.

Gerling traces the history of screenshots via photography. Prior to the emergence of computer screen images, his focus covers such things as x-ray-screen photographs and the fixating of the camera obscura. One way of perhaps overstating the importance of photography in the history of the screenshot would be to say the following: no photography, no screenshot. However, the history can also be told starting with the screen itself. This way of telling the story makes it possible to add a number of other precedents, precursors and tributaries to the source-points mentioned above. These forerunners are less interested in the photographic conditions that allow for the creation of a screenshot and more in the history of the screens themselves. Indeed, screen images existed long before the photographic shot, as the example of the camera obscura suggests. In general, this approach to the archaeology of screen images seeks to capture and record the content of a *dynamic* screen, as the idea of capturing the content of a screen is only necessary where those screens have ever-changing content. According to a thesis by Gerling that goes even further, photography emerged out of the need to capture and fixate the image on the screen of a camera obscura.[17]

In 1995, Lev Manovich presented an early attempt to trace the history of screens in an essay titled "Archaeology of a Computer Screen".[18] His broad definition posited that screens are media that open up right-angled windows into a different space perspective, a virtual world. Manovich sketched out the most important source-point for the archaeology of the screen starting from the history of framed or at least bordered images, thereby also assigning images such as paintings to the genealogy of the

[17] "Capturing an image that is already an image before it is taken: the ground glass screen of the camera obscura could have been the reason for a large part of photography-related developments in the 19th century. […] The verbal equation in the French protocol of ground glass screen of the camera obscura and the plate that records the image in the place where the screen is usually located, as 'écran', appears to be essential for the argument that the images were already there and admired before they were recorded – that is, before they were able to be recorded – and the plate of the daguerreotype takes its place". Ibid.

[18] Lev Manovich: "Eine Archäologie des Computerbildschirms", in: *Kunstforum International* 132 (1996), pp. 124–135.

screen. According to Manovich's approach, even the history of perspective drawing belongs to the ontology of the computer screen. Manovich designates three types of screens: he calls artistic surfaces such as painted images the "traditional screen"; he uses the term "dynamic screens" to designate cinema, television and video, which can change their content in time; and he sees the third type of screen, which he calls the "real-time screen", in radar screens, video monitors, computer screens and instrument displays. The novel element in this latter group of screens is that the "image can be constantly updated in real-time".[19] One of the characteristics these real-time screens have in common is that they are "generated by means of sequential scanning".[20] While a video screen belonging to the second type shows pre-made images, the screen belonging to the third type shows real-time images, for example, images from a surveillance camera. Manovich leaves it open as to whether or not the camera obscura and mirror image also fall under the category of dynamic screens.

Even if Manovich's broad-scale definition of images and screens makes it possible to establish some illuminating classifications in response to the question "What is an image?", it is necessary here to draw a more narrow definition in the case of screenshots, that is, to consider only those usually empty surface structures on paper, fabric and glass where the content changes dynamically and in real-time. In other words, I will define screens as Manovich's type-two and type-three screens and thereby exclude the general history of images. Without this exclusion, every art postcard and art-historical slide image would have to be seen as a screen image. As a result of this distinction, the examples shown here will not come from the history of art that one might see hanging in the Prado; instead, the examples will be drawn from scientific and technical books.

Media archaeology of the screen

How long have screens been in existence? If we exclude mirror images, the oldest group of screen images would have to be optical screens that function according to the principle of the dark room and were recorded via the medium of drawing. A very early example of such a screen image comes to us from the field of astronomy and the observation of the sun in the form of the helioscope (Fig. 3 a). A helioscope is an instrument that makes it possible to observe the sun and sunspots in

[19] Ibid., p. 125.
[20] Ibid., p. 127.

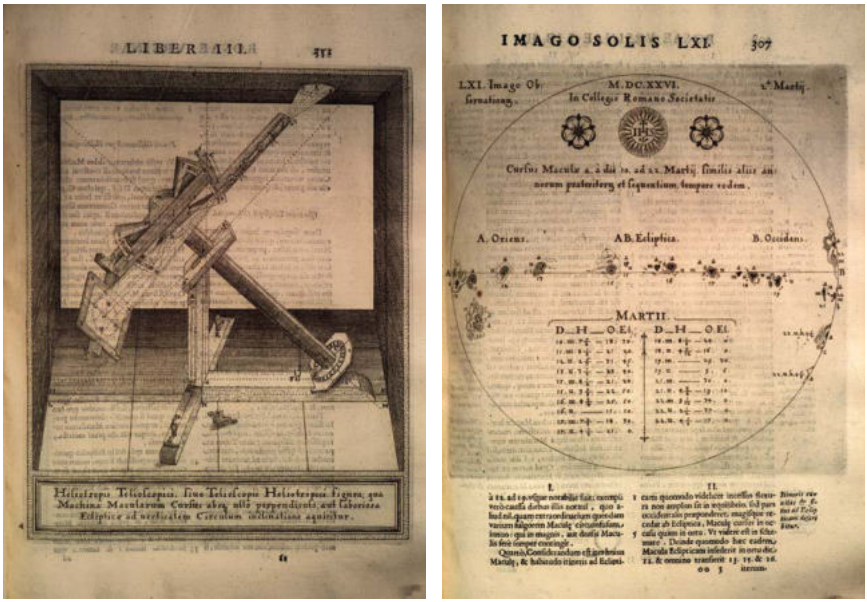


Fig. 3 a+b: Christoph Scheiner: *Rosa Ursina sive sol* (Bracciano, 1626–1630). View of a helioscope and an observation ("imago solis") using the helioscope.

a mediated way, as the sun is too bright to study directly. This method involves using a telescope to project the image of the sun onto a sheet of white paper hung up in a darkened room. Sunspots can be systematically observed on this paper and also captured and recorded in the form of drawings (Fig. 3 b). The first known helioscope was created by Christoph Scheiner (1575–1650). In his publication *Rosa Ursina*, this observational arrangement is recorded in the form of a print graphic, while also placing the screen of the helioscope in the picture.[21] In the circular format of the print, we see how the spots transmitted by the telescope draw the various shades of the sun. Much like an early "solar cinema", we see here a primal scene of the screen, whereby the natural light of the sun itself simultaneously casts an "imago solis" – that is, the image of the sun – through the lens onto the paper. Other "image projectors" that follow this set-up – ones that, however, depict brightly lit objects – are the projected images of the camera obscura. Even

[21] Christoph Scheiner: "Rosa Ursina, sive sol ex admirando facularum & macularum suarum phoenomeno varius. Bracciano: Andreas Phaeus at the Ducal Press, 1626–1630", Digitalisat, https://www.e-rara.ch/zut/content/structure/161020 (last seen: December 4, 2021).

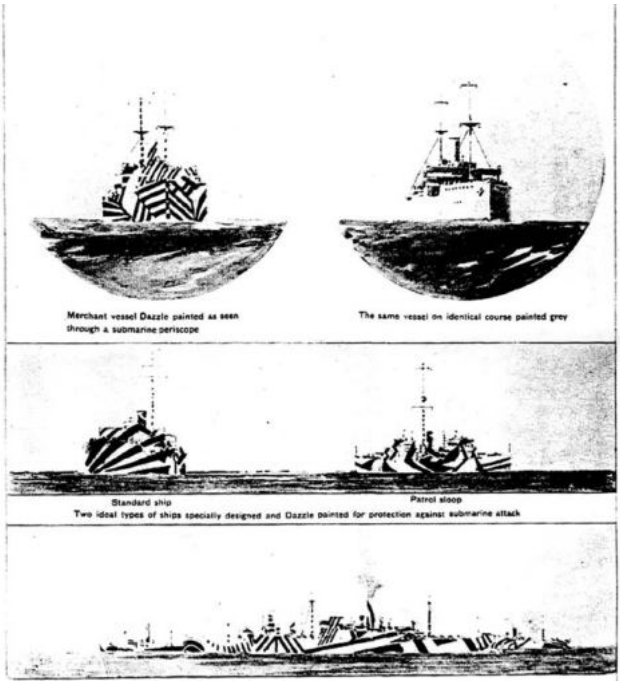


Fig. 4: Dazzle painting of a ship as seen through a periscope, handbook from WWI.

though they actually painted moving images from bright rays, they, too, were captured and recorded by means of drawings; for example, a painting by Canaletto (1697–1768) can, at least in part, be seen as a screen image in this regard.

Alongside radar screens – those already-mentioned precursors to screenshots – we can also add the view through submarine periscopes, at least in the form that prompted them to become part of everyday life for German submarine crews even before radar, that is, during WWI. The circularly framed view through a submarine periscope allows viewers – in a manner similar to that of a camera obscura – to capture only the framed image of the view of the surrounding water in an oblique mirror; that is, only in two dimensions. In this sense, it is similar to the telescope. However, it differs from the telescope in that the view is not aimed directly at the object. Moreover, when attempting to get an accurate assessment of a ship's position, there is one factor that makes it all the more difficult; the available perspective begins just above the surface of the water, which means that the viewing radius remains comparatively small. Such views are depicted in British handbooks on the camouflage

of steamships (Fig. 4).[22] The famous high-contrast stripe patterns of "Dazzle Paintings", which were designed to disrupt this limited view, are evidence of how images were developed in WWI for the purpose of fooling mediatised two-dimensional views such as those from a periscope.[23]

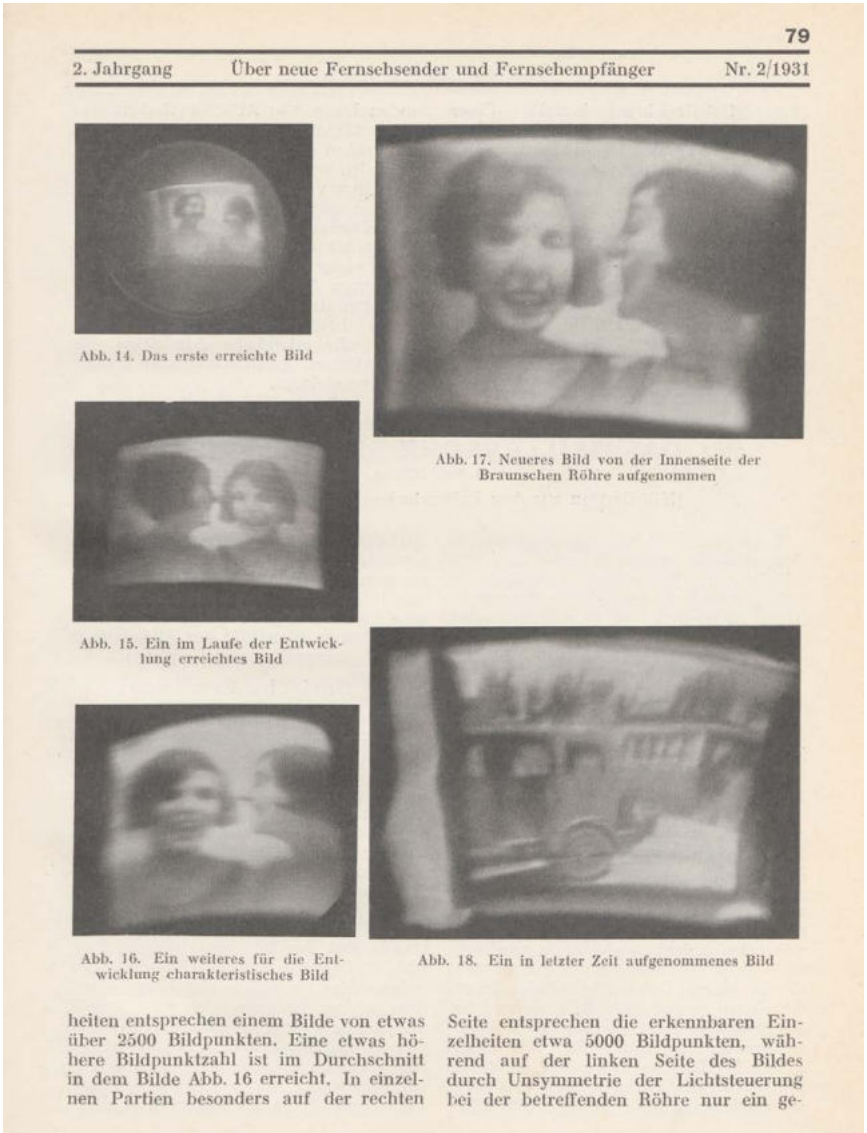
The historical screen images that come the closest to screenshots originate in the early years of television as it was being tested and experimented with simultaneously in several countries. In Germany, the first trial television broadcasts were undertaken in Berlin in the late 1920s and early 1930s. Roughly speaking, the idea was to divide an image line-by-line in a series of electrical pulses in such a way that the line could then be reassembled at the receiving end after the pulses had been sent out. The pulses corresponded to the light intensity of individual points in the encoder image. In these early stages, the technology still used a Nipkow disk, which was a perforated disk that divided up and scanned the image. Later this was replaced by the cathode ray tube, which used an electron beam to project the lines of light onto the TV screen more precisely and in high-definition. Developed using the technology of photography and transmitted in black-and-white, these images were later printed as photographs in trade magazines. In other words, they were images created in a technical context to document more-or-less successful screen transmissions and / or their disruptions.

In 1930, Germany's very first magazine for TV technology was published under the title *Fernsehen. Zeitschrift für Technik und Kultur des gesamten elektronischen Fernsehens* (Television. A magazine for the technology and culture of the entire field of electronic television). This journal regularly featured numerous screen images mainly drawn from tests relating to the new form of image transmission. In addition to the famous broadcasts of objects, such as scissors and pliers by the television laboratory of Dénes von Mihály, some of the other screen images that were reproduced on a regular basis were close-ups of two young women dressed in bathing suits and sporting dark bob hairstyles.[24] One

[22] See "Gefleckte Gestalten. Tarnungstheorien und -praktiken (1900–1918)", in: Claudia Blümle, Armin Schäfer (ed.): *Struktur, Figur, Kontur. Abstraktion in Kunst- und Lebenswissenschaften*, Berlin 2007, pp. 141–158. Extensive work has been done on the history of camouflage, for example, by Matthew Lukiesh: *Visual Illusions. Their Causes, Characteristics and Applications*, New York [1922] 1965; *Camouflage*, Scottish Arts Council, Edinburgh 1988; D. Williams, *Liners in Battledress*, London 1989.

[23] Paul Virilio addressed this connection extensively in his book *War and Cinema. The Logistics of Perception*, London 1989. On the camouflage of ships during WWI, see Elisabeth L. Kahn: *The Neglected Majority: Les Camoufleurs. Art History and World War I*, Lanham 1984.

[24] Birgit Schneider: "Die kunstseidenen Mädchen. Test- und Leitbilder des frühen Fernsehens", in: Stefan Andriopoulos, Bernhard Dotzler (ed.): *1929. Beiträge zur Archäologie der Medien*, Frankfurt am Main 2002, pp. 54–79.



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2. Jahrgang Über neue Fernsehsender und Fernsehempfänger Nr. 2/1931

Abb. 14. Das erste erreichte Bild

Abb. 17. Neueres Bild von der Innenseite der Braunschen Röhre aufgenommen

Abb. 15. Ein im Laufe der Entwicklung erreichtes Bild

Abb. 16. Ein weiteres für die Entwicklung charakteristisches Bild

Abb. 18. Ein in letzter Zeit aufgenommenes Bild

heiten entsprechen einem Bilde von etwas über 2500 Bildpunkten. Eine etwas höhere Bildpunktzahl ist im Durchschnitt in dem Bilde Abb. 16 erreicht. In einzelnen Partien besonders auf der rechten Seite entsprechen die erkennbaren Einzelheiten etwa 5000 Bildpunkten, während auf der linken Seite des Bildes durch Unsymmetrie der Lichtsteuerung bei der betreffenden Röhre nur ein ge-

Fig. 5: Photographs documenting the transmission of images using cathode ray tubes. Images taken from the German magazine *Fernsehen* from 1931.

of the images bears the title *Photography of a television image taken with a Braun tube* (Fig. 5 and 6). The women were actually actresses in one of the first television test films, long before graphic test patterns were invented. According to television history, these women were asked during the shoot of the film – which has since been lost – to sing the German



Fig. 6: A comparison of varying picture line counts. Images taken from the German magazine *Fernsehen*, 1931.

folk song *Horch, was kommt von draußen rein* (Hark, what comes in from outside) – even though it was a silent film.[25]

They were also asked to bite into an apple. In other words, the first German television film had a two-fold symbolic connotation in promising, from that point on, to bring the seductive knowledge of television into private living rooms "from outside." The transmission was staged like a Whitsun miracle designed to address and calibrate two things: the technical devices of the screens, on the one hand, and the many Berlin television amateurs and hobbyists, on the other. Indeed, these tinkerers had bought TV construction kits and were waiting with anticipation and in receiving mode for transmissions. As it were, four image technologies intersected in these screen images of the two women in the journal *Fernsehen*, namely film, television, photography and printing techniques (autotype). Plus, there was also the radio; in the early days of German television, the test film was broadcast during radio breaks, that is, via radio frequencies, for the purpose of the technical elucidation of the "image quality", "image patterns" and "line skips."

The many images reproduced in the initial editions of the journal *Fernsehen* showed reproductions of television broadcasts characterised by stripe and step patterns. And yet, even with the lowest image resolution, we still think we can make out the faces of the women well enough; for example, a beauty mark becomes visible starting at 5,000 pixels. The

[25] See Peter Paul Kubitz (ed.): *Der Traum vom Sehen. Zeitalter der Televisionen*, Dresden 1997, p. 14.

test film served first and foremost as a way of comparing the increase in quality resulting from different pixel levels. In order to compare and contrast the quality, the photographs of the images on the screens were framed and presented side-by-side at the Berlin International Radio and TV Exhibition (Fig. 6). The framed images of the pretty female faces appear almost like trophies of the early days of television, as if they were proof of the ability to transmit moving images of living people and to make them materialize on a distant screen.

Sunspots, enemy warships and two pretty female faces appear on the screens of helioscopes, periscopes and televisions respectively. They all point to a history of dynamic images that takes place on screens. The materiality of the screen consists of glass, paper or projection screen, whereby the images themselves consist of electrons, light and shade. At the same time, the screen images are situated in the context of test images or images designed for use in technical instruction manuals and handbooks. Their purpose is to improve and enhance the images on the screens themselves and / or to explain how these are produced. In this sense, the images examined here can be referred to as being *operative*, as their theme is less their content than their functioning. In other words, the screen images make it possible to discuss the technology of the screen, but they also, in turn, make it possible to more accurately calibrate the devices that generate them in the first place.[26]

These TV test patterns elucidate the long-running historical equivocation of technological and erotic desire. Indeed, female portraits are used time and again in technical manuals to calibrate film projectors and scanners, as well as to determine the right settings for colours in programmes such as Photoshop. This is where the statement uttered by Hillel Schwarz in his book *The Culture of the Copy* becomes significant: "Photocopying, like photography, is copying as appropriation."[27]

With a flash and a rifle – the screenshot as an act of appropriation

What are screens aiming at? In this section, I would like to elucidate one last aspect of the screenshot from an historical perspective, all the while keeping in mind the notion of the appropriating gesture associated with

[26] "Operative images do not represent an object, but rather are part of an operation". See: Harun Farocki: "Phantom Images": in *Public* 29: New Localities, (2004), p. 17.

[27] Hillel Schwartz: *The Culture of the Copy, Striking Likenesses, Unreasonable Facsimiles*, New York 1998, p. 191.

copying. To date, this final aspect – namely the connection between screens and the act of shooting – resonates most clearly in the aforementioned *Shoot-out Piece* by David Hall, as well as in the war technology associated with periscopes. Here, the observation leaves the formal-structural question of screen images in the sense that we have considered them until now and instead turns to the following two questions: What level is opened up by the term "shot" in the word "screenshot"? And how is the activity of hunting connected with the German concept of the screen or *Schirm*?

To begin with, it is possible to read the "shot" in "screenshot" in terms of the history of photography. In 1977, Susan Sontag pointed out the connection between photography and shooting in her book *On Photography*, whereby she characterised the link as being based on the activity of hunting:

> One situation where people are switching from bullets to film is the photographic safari that is replacing the gun safari in East Africa. The hunters have Hasselblads instead of Winchesters; instead of looking through a telescopic sight to aim a rifle, they look through a viewfinder to frame a picture. [...] The photographer is now charging real beasts, beleaguered and too rare to kill. Guns have metamorphosed into cameras in this earnest comedy, the ecology safari, because nature has ceased to be what it always had been – what people needed protection from. Now nature – tamed, endangered, mortal – needs to be protected from people. When we are afraid, we shoot. But when we are nostalgic, we take pictures.[28]

The act of photographing wildlife and the act of hunting wildlife share similar virtues. For example, wildlife photographers and wildlife hunters both require excellent manual skills and physical techniques in the field. The ability to get close enough to animals to snap a picture of them or shoot them dead requires not only patience, but also a good knowledge of animal behaviour. Photographers and hunters frequently have to sneak up on animals, often camouflaging themselves in order to do so. This connection was explicitly drawn in an early advertisement series created by Kodak (Fig. 7).

Until the beginning of the 20th century, lenses and objectives were not sensitive enough to photograph wildlife in the actual wilderness. For example, it was 1906 before *National Geographic* published its first wildlife photos. The publication that systematically showcased the connection between the two activities outlined here – namely hunting and photography – is actually Carl Georg Schillings' (1865–1921) *Mit Blitzlicht and Büchse* (With flashlight and rifle) from 1905. The heavy tome features over 300 reproductions of

[28] Susan Sontag: *On Photography*, New York 1977, p. 15.

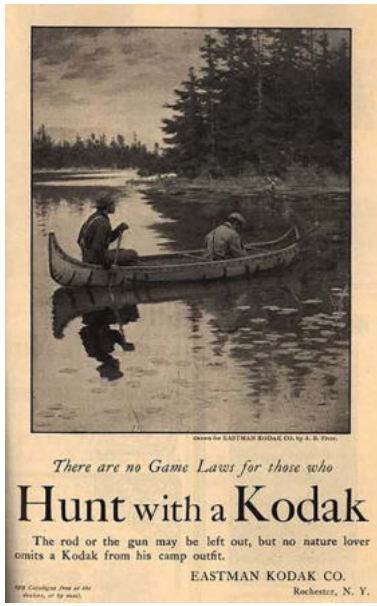


Fig. 7: "Hunt with a Kodak". One of a series of Kodak advertisements drawing a comparison to hunting.

black-and-white photographs taken by the author in East Africa (Fig. 8 a-d). Many of the animals depicted in the photographs were also shot by Schillings and his companions. How are these two gestures related?

Schillings is considered not just a hunting pioneer but equally a trailblazer in the realm of wildlife photography and nature conservation. In fact, he was one of the first individuals to document a variety of wild animals in their natural habitats in East Africa. His book is an early example of the art of wildlife photography, including photographs taken at night. However, at the same time, it is also a book about killing animals with a rifle. The two activities were linked not only in the same book, but also in the same field; this is demonstrated by the numerous animal observations and hunting experiences described exhaustively in the book. Often the sequence of the images depicted in these observations changes quickly from the living animal to the slain animal. For example, in the chapter about rhinoceroses, Schillings writes: "I waited until I could see his horn silhouetted against the starry sky, advanced towards the great black bulk, and fired".[29]

[29] Carl Georg Schillings: *Mit Blitzlicht and Büchse*, Leipzig 1905, p. 168.

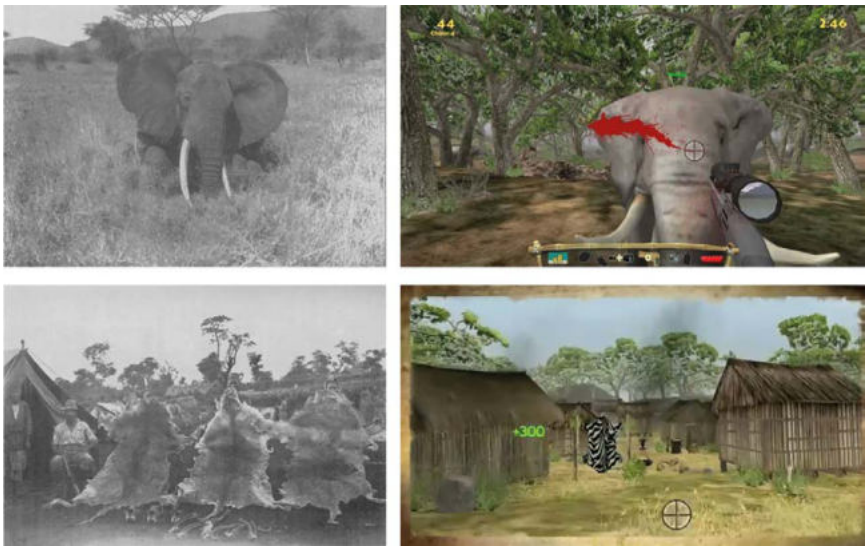


Fig. 8 a-d: Images taken from Carl Georg Schillings: *Mit Blitzlicht and Büchse (tr: With flashlight and rifle)* (1905) and screenshots taken from the hunting simulator Remington Super Slam Hunting: Africa (Mastiff 2010).

Schillings' work sheds light on the then close connection between hunting and wildlife conservation – an association that might appear entirely foreign to us today. Indeed, the author always intended to use the animals he shot for research and preparation in natural history museums. Schillings explicitly addresses the disappearance of animals and landscapes in his book. For example, in the first chapter, which is titled "Die Tragödie der Kultur" (The tragedy of civilisation), he describes the situation in detail and with several examples from around the world, lamenting the manner in which the "explorer ruthlessly pursues his victory in every direction, [...] destroys directly and indirectly everything that stands in his way. [...] The indigenous population of entire countries who are unable to adapt to the new (ways), must perish. Along with it disappears a rich and beautiful fauna that enabled the existence of those indigenous people over centuries, but which now, often in the space of only a few years, are murdered ruthlessly".[30] He justifies his own big-game hunt in "our German colonies" with the tasks of collection and zoology: "Where an unexplored region full of wildlife is in question, the interests of the explorer and collector should always be put before those of the sportsman".[31]

30 Ibid., p. 7.
31 Ibid., pp. 8–9.



Fig. 9 a+b: Night shot by Schillings, 1905 and a screenshot from a wildlife photo trap camera, 2013.

The similarities between Schillings' photographs and screenshots taken of the console games and hunting simulators known as REMINGTON SUPER SLAM HUNTING: AFRICA and CABELA'S AFRICAN ADVENTURES[32] (Fig. 8c+d) are striking. The first game is advertised as follows:

> Hunt Africa's most dangerous game! Stalk over 30 of Africa's most lethal animals to fill your trophy room and become the greatest Hunter on the Dark Continent. Use over 30 real, licensed weapons, scopes, and accessories to climb your way to the top of the Online Leaderboards! Remington Super Slam Hunting: Africa features both competitive and cooperative multiplayer for up to 4 players. Compete for 175 achievements and trophies. More than 30 unique and dangerous environments await you! No passport required.

Virtual hunters are invited to hunt antelopes and lions using Remington rifles and with the ultimate goal of collecting trophies in the process. Unlike Schillings, however, the nostalgic aspect of endangered animals no longer plays a role in the simulacrum of a natural world that has been coded, computed and maintained in a permanent way in the game.

There is yet another similarity between the two, namely the results of modern surveillance cameras or so-called photo trapping cameras. Many such cameras are infrared cameras designed to monitor wildlife in their natural habitats; they are equipped with motion detectors that are automatically triggered when animals approach (Fig. 9 a+b).

The activity of hunting for animals in pictures and as trophies is also a source-point for the cultural technique of the screenshot. The German term *Schirm* (screen) and the war-related technology of shooting (shot) intersect historically and in a two-fold manner in the concept of the

[32] *Remington Super Slam Hunting: Africa* (2010), Mastiff, Wii; *Cabela's African Adventure* (2013), Activision, PlayStation 3.

screenshot. For example, the entry describing the word *Schirm* (screen) in the German dictionary published by the Brothers Grimm states that it comes from "shield, umbrella, protective roof, shelter" and that it is an "old war term", e. g., to describe "a protective device of any kind against enemy attacks, a covering material made of light wood, covered with metal or furs", "a thing that protects". In other words, a *Schirm* (screen) can be used to repel and defend against enemy attacks. "The hunter differentiates between hunting screens, body screens, propriety screens, bait and hunt screens, sneak-up screens; the latter are used to make it possible to creep up on wild animals".[33] Viewed in this light, screenshots are not simply fixed arrangements of screens that can be understood culturally in the context of the history of the painted canvas; instead, they represent the diverse, multifaceted connections between media techniques and hunting methods. When David Hall implemented the idea of the screenshot in the literal sense in his work *Shoot-out Piece,* he was not shooting *at* the screen, but instead *from out of* the screen; nevertheless, with help from the references elucidated here, his gesture can be interpreted in multiple ways and, most importantly, as one that never comes to a standstill.

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Pathways (extracted from The Continuous City)

Gareth Damian Martin

Beneath the dust and grain: a city, continuously re-experienced, remembered, reconfigured. Absent of inhabitants, of infrastructure, of time. Made only of images, delivered at the steady pace of 30–60 per second, reconstructed by those that can never enter.

The pathway suggests the city's nature: ceaseless, designed for continuous motion, a machine for running, not for living. Its "spaces" must be preserved by continuous cycles of computation, infrastructural labor, flow of electricity, burning of fossil fuels, etc.

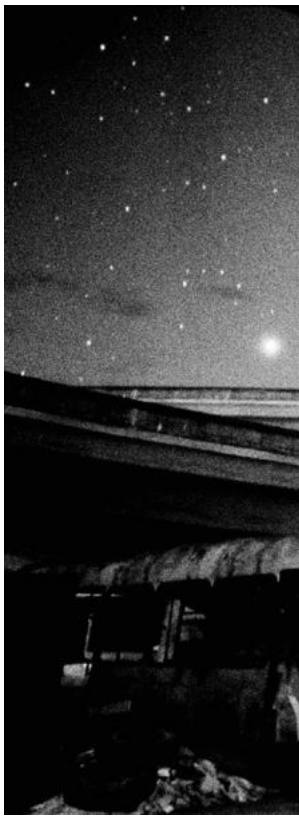
Yet here – data turned to light, light turned to chemical traces – the city is denatured, frozen outside of continuity.

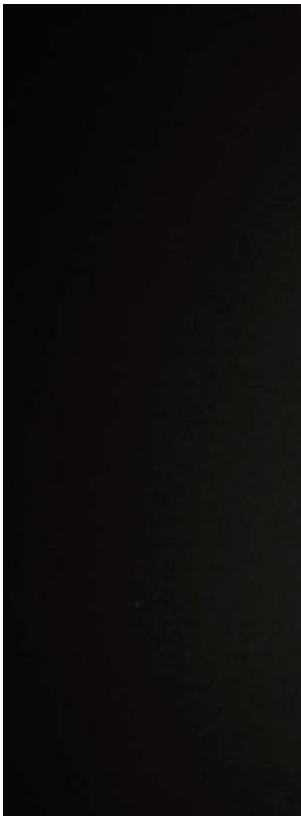
The grain invents detail, an approximation of an idle mind.
The frame invents context, an approximation of roving eyes.
The desaturation invents time, an approximation of experience.
The city approximates us, inventing it continuously.

35mm photographs (Fujica STX-1) of projected images from Gravity Rush 2, Kane and Lynch 2: Dog Days, Grand Theft Auto V and Mirror's Edge: Catalyst.













Paper Computing and Early Screenshot Cultures

Jacob Gaboury

To screenshot is to capture, if only for a time, the visual output of a computer. A simple button or gesture on any modern device, the term is complicated when we consider the long history of computing as a medium to be documented. The principal challenge in constructing a genealogy of the screenshot lies in the range of terms, practices, and technologies that have coalesced around the screenshot in its contemporary form. There is a danger in collapsing these subtle distinctions in a treatment of the screenshot as a singular practice. Likewise, any history of screen images risks the anachronistic claim of locating the screenshot decades prior to its development as a conceptual term or actor's category, or of privileging the emergence of the term "screen shot" while ignoring the multiple and competing screen documentation practices developed throughout the twentieth century. Ultimately these challenges are taxonomic and categorical, asking us to delimit the shape, meaning, and function of the screenshot such that it might be made legible as a distinct technical practice and object of analysis.

There is a clear value to this precision in the development of a shared object of inquiry. Nonetheless, this compulsion to narrow the object of our analysis by identifying the screenshot as a materially distinct media practice has limited any investigation into the broader function of the screenshot as a technique for the historical mediation of computational systems. As much action as object, the screenshot is as much a discrete material form as an *orientation* toward computation, untethered from any specific technology. In this view any visible trace of the act of computing might be understood as part of its long history, such that we need not limit ourselves to the photographic imperative implied by the screenshot or screen-image. Refigured in this way, screenshots may be understood as the objects or techniques through which we translate and make legible the act of computation, preserving that act through a practice of secondary mediation. To understand the screenshot in this expanded sense will require an equally expansive historical frame, along with an expansion in the forms and practices we engage in tracing this compulsion toward documentation. In what follows I look to two moments in the history of graphical computing to examine those media practices that emerged

alongside the screen-image but are not contained within the mediating interface of the screen. In doing so I will suggest that the contemporary screenshot has its origins in a range of media practices both visual and textual, image and print.

How have we historically *pictured* computation such that it might be captured and preserved? While the practice of screen photography is as old as the modern computer itself, *digital* screenshots as we know them today are a relatively recent invention.[1] Prior to the 1990s there was no method for capturing the visual output of graphical systems in software as an image file, such that one of the principal challenges in historical writing on computational culture is the often-ephemeral quality, both real and imagined, of computing as it has been historically understood. For most of its history the computer was used primarily as a research tool for the calculation of complex problems. While experimental applications in computer graphics stretch back some sixty years, the vast majority of computational output until well into the 1970s was text and number. As such, the vast majority of computational systems followed what Nick Montfort has called the "continuous paper" tradition of computer input and output.[2] This includes the long history of paper tape and punch card storage, but also print terminals and teletypes at which commands would be input as text and results would be output as type on paper. While punch card programs or programming instructions might be saved by researchers for later use, paper output was rarely archived or preserved, as the value of such calculations was numerical information, not visual representation.[3]

This paper tradition is equally present in the history of graphical computing, where large printer-like plotting devices were used throughout the twentieth century to translate x-y coordinate data into points and lines on paper using a printer control language. Much of what are now considered the first graphical images produced by a computer took the form of these paper drawings, with artists such as Frieder Nake, A. Michael Noll, and Manfred Mohr producing a range of highly geometric, computer-generated plotter drawings throughout the 1960s that circulated widely at exhibi-

1 Matthew Allen: "Representing Computer-Aided Design: Screenshots and the Interactive Computer circa 1960", in: *Perspectives on Science* 24/6 (2016): 637–668.

2 Nick Montfort: "Continuous paper: The early materiality and workings of electronic literature", in: *Modern Language Association,* Philadelphia 2004, http://nickm.com/writing/essays/continuous_paper_mla.html (last seen: July 29, 2021).

3 A clear example of this is the early text adventure game *Adventure* (aka *Colossal Cave Adventure*), developed from 1975–1977 by Will Crowther. While the original FORTRAN code for *Adventure* has been preserved, the execution of the game was accomplished through teletype interfaces and paper rolls that were generally disposed of after the game was played. The game was later adapted for screen displays.



Fig. 1: Frieder Nake holding up works produced using a computer plotter, Stuttgart 1966.

tions dedicated to *cybernetic* or machine-driven art, including a pair of now infamous shows at the Museum of Modern Art in New York and the Institute for Contemporary Art in London (Fig. 1).[4] That these works are remembered is due largely to the practice of documenting and preserving them in this way, such that they might circulate beyond the moment of calculation as physical objects. The very first computer plotters were developed in the late 1950s, and were used principally for computer aided design and other non-numerical forms of output. As computer screens were not yet commercially available for most applications – and what few did exist were radically different than contemporary screens in their use and functionality – plotters were often the only way to see the output of one's graphical calculations.[5] A natural byproduct of paper computing was the capture of the visual output of computational systems, but the storage and preservation of said output was largely incidental to these systems' general function. For most non-artistic applications, plotter images served a discrete function to display the output of a calculation, and had little use beyond this relatively brief moment of troubleshooting. In the course of

4 Pontus Hultén: *The Machine: As Seen at the End of Mechanical Age*, The Museum of Modern Art, 1968 and Jasia Reichardt (ed.): *Cybernetic serendipity: the computer and the arts*, London, New York 1969.

5 Jacob Gaboury: "The Random-Access Image: Memory and the History of the Computer Screen", in: *Grey Room* 70 (2018), p. 24–53.

producing usable drawings, researchers might make and discard dozens of test plots, as there was often no way to determine if the program had produced a desired result without executing such a drawing. The results of such a calculation were not screenshots in any formal sense, as there was no screen of which to speak, nor was any photographic device used to capture its output. Even later when screens became more widely available, for any application that was not purely visual – large scale architectural renderings, artistic experimentation, etc. – paper output was preferable to screen photography, serving a similar purpose of extracting the visual output of the screen, displaying and thereby recording the work of computing, if not its internal function.

While paper computing may seem a strange artifact of a moment in the history of computing before the development of commercially available computer screens, this tension between the visual display and printed document continues well into the 1980s, with photographic and paper outputs serving distinct technical and aesthetic functions within the media environment of microcomputing. It is here that the term *screen shot* first emerges to describe a narrow and somewhat minor practice of photographing the graphical display of a computer screen, most often for use in design, advertising, and print publication. Far from dominant, in this period screen shots competed with a number of adjacent terms and technologies used to describe related but distinct technical practices.

Until the mid-1990s, the most common term for capturing the contents of a computer screen was *screen dump*, referring to the dumping of content from a text-only screen into a text file, or even dumping the content of a graphical program or frame buffer into a printer (Fig. 2)[6]. The action here is not the photographic capture or the weaponized shot but the emptying of content or data, the offloading of information from one object to another. The term begins to make sense if we consider it in its historical context. In this period the vast majority of home computers were not primarily graphical, as the graphical user interfaces that define contemporary systems were limited to experimental machines at corporate research centers until at least the mid-1980s with the release of the Apple Lisa and Apple Macintosh computers.[7] For most users the

[6] Mark Russinovich: "Apple Hi-Res Screen Dump", in: *Compute! Magazine* (Dec. 1985), https://www.atarimagazines.com/compute/issue67/348_1_Apple_Hi-Res_Screen_Dump.php (last seen: December 20, 2021).

[7] There is a direct line that can be drawn from the Xerox Alto computer to the Apple Lisa and Apple Macintosh computers, which form the origin for many of our contemporary windowed interfaces. Even after these systems were released, many microcomputers and later PCs were dominated by the textual logic of command line systems.

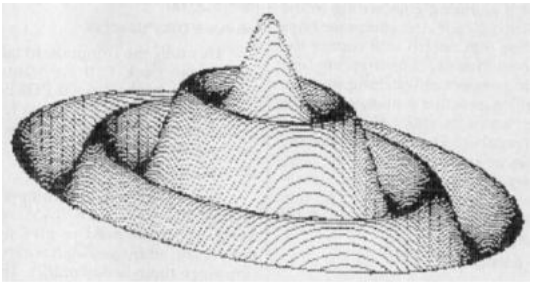


Fig. 2: Graphical screen dump produced with an Apple IIe or II+ computer connected to an Epson printer, ca. 1985.

principal visual output of computational systems were printed documents, not photographic images. Nonetheless, the printers of the 1980s were highly limited and could not reproduce an image on paper exactly as it appeared on the screen of a computer. If precise reproduction was needed – for example, to reproduce the visual appearance of a video game in a print magazine – then photographic screen shots would be used. It is for this reason that companies like Xerox were deeply invested in the development of new print systems whereby a user could print a page exactly as it appeared on their screen, a technique that came to be known as "What you see is what you get" or WYSIWYG. In WYSIWYG we see the collapsing of textual and graphical forms of computation into a singular technical practice, such that to photograph a computer screen and to print out its contents produced distinct but analogous image forms.

If early screen photography is part of a long history of screen-images, we might conversely understand these paper documents as part of a similar practice invested in the documentation and preservation of computational output. While this mundane, everyday practice of paper computing is less prevalent in historical treatments of visual computing, I would argue that paper systems are nonetheless part of the historical lineage of contemporary screenshot technology, as many of the functions these paper documents served are now imbricated in the various cultures of contemporary screenshots, which treat textual, numerical, and graphical output as equally legible for capture. Moreover, if we are invested in the historical work that the screenshot performs in documenting the visual culture of early computing, we must likewise account for this parallel history through which screen-images were captured. That we can study the history of visual computing at all is in large part due to these practices, and to limit ourselves to only those images that follow in a single visual tradition is to restrict the true breadth of this enduring technique.

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In-Front-of-the-Screen Images – A Photo Essay

Winfried Gerling



Fig. 1: Julia Dembowski: *Das Zuhause der blinden Wesen* (The home of the blind beings), 2016.

The best things in life are truly free
Singing birds and laughing bees
"You've got me wrong", says he
"The sun don't shine in your TV"

(Lyrics from the song "Story of an Artist"
by Daniel Johnston from the album *Don't Be Scared*, 1982)

In the present era of global pandemic, many of us find ourselves sitting in front of screens,[1] which serve to keep us at a safe social distance from

[1] See, for example: André Gunthert: "Le triomphe des images", in: *imagesociale.fr*, April 3, 2020: "We discover it anew on a daily basis in our digital exchanges: image is not synonymous with presence. Countless pragmatic characteristics separate face-to-face experience from audiovisual mediation, which is not reproduced – or only poorly so – by connected tools. I cannot touch or hug my virtual interlocutor. And the mosaic of screens

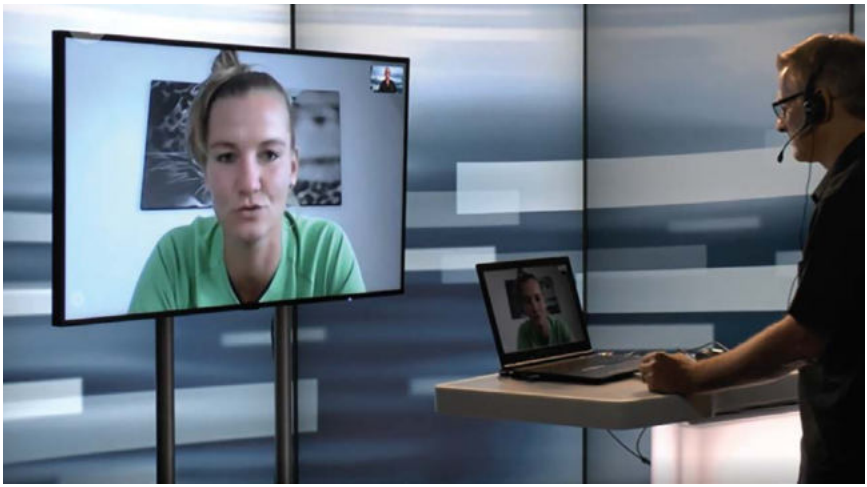


Fig. 2: Alexandra Popp, a player on the VfL Wolfsburg football team, talking to Hermann Valkyser about the re-start of the women's Bundesliga in Germany (May 30, 2020).

an infectious world.[2] This situation has led to a fundamental change in the way we perceive images depicting people in front of screens. Indeed, today, most of us would be able to accurately identify an image as originating from a screen, even when an actual screen is nowhere to be seen. In fact, photographs, screenshots and screencasts showing people on and in front of screens have even reached the mainstream media, where they almost always instantly reveal themselves as such, usually because their aesthetic points to a screen origin.[3] In other words, when we see a person depicted at an angle from below, sometimes wearing headphones, we can confidently deduce that the image is coming from a laptop or video-conference setting. The laptop[4] – which is usually placed

in a video conference offers merely a disembodied and distant emulation of the physical meeting, with its various levels of communication. But the image is no less irreplaceable when circumstances prevent direct contact".

2 For more on the etymology of the terms "screen" and "Schirm" see the introduction to this volume as well as Winfried Gerling: "Screenshotten", in: Heiko Christians, Matthias Bickenbach and Nikolaus Wegmann (ed.): *Historisches Wörterbuch des Mediengebrauchs 3*, Cologne (forthcoming).

3 The supposedly transparent characteristic of the medium reveals itself in its aesthetic. In this sense, one might compare it to the moment when a brushstroke or dab of paint reveals itself to be autonomous. See, for example: Artemisia Gentileschi: *Judith and Holofernes* (ca. 1620). In this painting, the blood splashing out of the beheaded Holofernes is, in parts, no longer painted but rather blotted as paint onto the canvas.

4 The basis for this possibility is the webcam, which Apple has been integrating into its laptops and desktop computers, such as the iMac, in the form of a so-called iSight camera

on a flat surface in front of the person, slightly below their face – is aimed up at them, often at an unfavourable angle. The background behind them, which in many cases has been algorithmically blurred, allows us to identify the software through which the image is being conveyed. The face depicted on the monitor is usually not covered by a mask – a form of self-presentation that is often no longer possible in public. In this sense, the image on the screen conveys a level of openness that exists within the protection of the monitor. At the same time, the image also reveals a privileged form of labour – one that does not require a person to expose themselves to any risk of infection.

Oddly enough, we no longer simply look *through* these images to the protagonist; instead, we look *at* them and thereby register a mediation of the mediation. These are second-order images,[5] that is, media-reflexive images that intentionally exhibit their status rather than unintentionally revealing it via some sort of malfunction.[6] In contrast to the theory put forward by McLuhan and others that "the content of any medium is always another medium,"[7] the content of the medium in this case is the very same medium itself. Of course, this only functions in the context of the computer's status as a meta-medium[8] that unites all forms of (tele-) presence. My hypothesis here is that the screen image of a computer – whether in the form of a screenshot or in tandem with photography – is ideally suited to capture the image of a reality that is wholly unique as an operative image. In other words, I would like to argue that screen images are capable of documenting a reality that exists in an entirely distinctive – or, better yet, personalised – manner on one single computer. We see through these images to the surface of the (small) computers and to the surfaces of the platforms.

In turn, these images become evidence of a connection to the world in which personal relationships – to the world and its subjects – are themselves revealed to be mediated by the screen.

This type of connection to the world goes even further than Huhtamo's very general yet apt description of our relationship to screens from 2004:

since 2005. There are many other types of web cameras connected to computers as well as face cameras in smartphones; however, they will play only a subordinate role here.

5 See the essay by Birgit Schneider in this volume.

6 See Dieter Mersch: "Medialität und Undarstellbarkeit: Einleitung in eine negative Medientheorie", in: Sybille Krämer (ed.): *Performativität und Medialität*, München 2004, p. 75–96.

7 See Marshall McLuhan: *Die magischen Kanäle*, Dresden, Basel 1995 [1964], pp. 22–23.

8 See Lev Manovich: *Software Takes Command*, London, New York 2013, p. 101 ff. He is referring to a term introduced by Alan Kay.

"An increasing part of our daily lives is spent staring at screens".[9] The inactivity associated with the act of staring at a screen is confirmed, on the one hand, in its being spatially bound to the screen:

> [As] the 'mobility' of the gaze became more 'virtual' – as techniques were developed to paint (and then to photograph) realistic images, as mobility was implied by changes in lighting (and then cinematography) – the observer became more immobile, passive, ready to receive the constructions of a virtual reality placed in front of his or her unmoving body.[10]

On the other hand, however, the type of activity now directly associated with the screen can no longer be reduced solely to the act of *staring*. As a result, the images we see today reveal the extent to which a transformation in the physical relationship to the screen has also taken place – a change that can be inferred by examining the pictorial history of images of human beings in front of screens.

In this sense, the images mentioned at the beginning of this essay stand at the end of a development I will be endeavouring to sketch out here. Using a series of photographic images depicting people interacting with screens, I will trace the relationship between the screen – and the manner in which it reveals itself in these images – and its observer or user. I have drawn my selection of images from a variety of different sources and contexts and make no claim to provide a fully exhaustive account of the phenomenon.

My ultimate goal in this essay is to delve deeper into a realm that became more and more compelling as a *peripheral topic* in the course of my overall exploration of screen images and screenshots, namely the realm of images depicting screens and the human beings interacting with them.

My interest was triggered in particular by the work of Lee Friedlander, including *The Little Screens* (1963–1969) and *At Work / MIT Boston and Vicinity* (1985–1986), the latter comprising his photographs of labour conducted at screens. Completed some 20 years apart, these two series already reveal a transformation in our relationship to screens – one that I consider to be both telling and extremely instructive.

Rather than approaching the screen as a canvas or exploring the act of projection, I will concentrate in this essay exclusively on photographic evidence[11] that thematises screens as objects of nearby human environ-

[9] Erkki Huhtamo: "Elements of Screenology: Toward an Archeology of the Screen", in: *ICONICS: International Studies of the Modern Image* 7 (2004), pp. 31–82.

[10] Anne Friedberg: *Window Shopping. Cinema and the Postmodern*, Berkeley 1994, p. 28.

[11] These can, however, also be screenshots or screencasts which, as far as I'm concerned, should be categorised as photographic practices. See: Winfried Gerling: "Photography

ments. To that extent, this essay will focus on images of human beings in front of television sets as well as both in front of and with computers.

The fact that these two technologies – the television and the computer – are inseparably linked is due to the alliance they entered into with one another long ago. Indeed, today, a computer (laptop, smartphone, desktop, etc.) is just as much a *television* as a television is a computer capable of running programmes and processing collected sensory data and other information.

The images explored in this essay will consist of still photos that capture the multifaceted relationships between human beings and screens, which have also become mobile themselves. These images will draw attention to a relationship that has undergone a dramatic transformation over the past 90 years.[12] Indeed, it is a long path from analogue transmitter-receivers to the touchable interfaces of the universally connected calculating machines we have today. And it is precisely this path that I hope to map out effectively in this essay.

TV

In the earliest images of people in front of screens, the screen is depicted as an entity in the world, that is, as a clearly defined object perceived by an observing subject. Human beings are often shown gathered around the device, which glows much in the same way as a campfire (McLuhan) (Fig. 3).

The history of TV-watching has taught us, however, that there were actually very few televisions set up in the front parlours of people's homes in the medium's early days, even in Germany, which is considered to have been one of the first TV nations.[13] For this reason, we would be better served to interpret these early images as an attempt to publicise the apparatus as a new medium rather than as documentary evidence of a device that was in everyday use at the time. At the steep price of

in the Digital. Screenshot and In-Game Photography", in: *Photographies* 11/2–3 (2018), pp. 149–167.

12 I have chosen to begin this history with TV and not with the Panorama, Laterna Magica, cinema or X-ray screens, because this paper is concerned with the promise of live transmission, which is a form of tele-presence and tele-actuality that has little in common with a show or performance. I am also keen to explore the proximity of the screen – as an object – to the bodies of viewers and its direct impact on them.

13 Regular public television got its start in Germany in 1935, with broadcasting consisting of two hours on three evenings per week. The new technology was championed by the Nazis, who sought to demonstrate Germany's leading position not merely in radio, but also in the entire field of telecommunications.



Fig. 3: *Fernsehen 1935* (a FEB-type television set produced in Germany by Radio A.G.D.S. Loewe).



Fig. 4: Germany's first *Fernsehstelle* (TV viewing station) set up on April 10, 1935 at the Reichspostmuseum, today's Museum of Communication in Berlin, Willy Römer, 1935.

1,800 Reichsmark per set, there was no way televisions would quickly become *Volksempfänger*, the people's receivers. Instead, so-called *Fernsehstuben* and *Fernsehtheater* were introduced, TV parlours and theatres that featured large-screen projections for viewing by exclusive audiences. Most people were reached via Fernsehstuben, the first of which opened in Berlin in 1935. Unlike cinemas, these TV parlours were able to offer live transmissions.

This image (Fig. 4) shows the first-ever *Fernsehstelle* or TV viewing station, which was set up in Berlin's Reichspostmuseum: the photo was taken on April 10, 1935, one day after the station officially opened. On the one hand, the image testifies to the technology's character as a public attraction; on the other, it reveals a spatial situation that is entirely unsure of itself with regard to the ideal placement of the audience. At a size of 18x22 cm, the screen is only slightly larger than that of the first Apple Macintosh from 1984; in other words, it doesn't allow for any significant viewing distance, especially since the quality of the images at the time (180 lines with a low contrast) was hardly ideal for viewing from far away. For the time being, it would seem that a typical cinema set-up was emulated; the television was placed in a slightly elevated position on a makeshift platform in front of several rows of spectators and operated by a skilled technician.

This set-up actually marks the beginning of a custom we would call "public viewing" today. It got its start in the Fernsehstuben of Berlin in



Fig. 5: Large-screen projector in a *Fernsehtheater* (TV theatre), 1936.

1935 and reached its first climax as an instrument of Nazi propaganda at the 1936 Olympic Games in Germany.

During the 1936 Olympics, up to 700 viewers per day were able to enjoy the new medium of television in so-called *Fernsehtheater* or TV theatres.[14] The early days of these broadcasts were marked by a desire to see the apparatus make its way into the homes of everyday Germans, however that development would not occur until after World War II.[15] Even though a considerable amount of energy was invested in developing television technology all the way up to the beginning of WWII – mostly as a means of asserting Germany's leading position over other countries – the radio remained the key medium for the purposes of Nazi propaganda.[16]

It was not until after WWII that television sets achieved widespread use in western industrial nations. The programmes they broadcast spoke to the daily routines and needs of the growing white middle class. As Lynn Spigel demonstrated in the case of the United States,[17] this trend was closely connected to urban developments in large cities, which had become too cramped, thus prompting a wave of expansion to the suburbs[18] (*suburbanisation*). In turn, this led to the emergence of corresponding cultures, which were then reflected in television programmes.

Countless photographs from this era depict the supposedly typical home environment, usually a white family gathered together around a TV set watching the latest programmes (Fig. 6). These stereotypical images reveal the effort to establish TV as a medium suitable for the entire family,[19] and the focus is placed on the presentation of an accessible culture for members of suburban society.

"While the act of watching TV was promoted as an imaginary night out on the town, this home-theatre model also fostered the notion of a nostalgic return to the family values associated with a settled and rooted

[14] Peter Paul Kubitz: *Der Traum vom Sehen – Zeitalter der Televisionen*, Dresden 1997, p. 22.

[15] The production of these apparatuses was discontinued in Germany with the advent of WWII in 1939. For a detailed history of television in Germany, see: Kubitz: *Der Traum vom Sehen*.

[16] This extended as far as to the Reichspost's process of awarding contracts, which excluded Bosch, Loewe and Zeiss Ikon from eligibility, due to their international relationships and, in certain cases, Jewish background. The idea was to prevent the technology, which was also very important to the military, from falling into 'foreign' hands.

[17] See Lynn Spigel: *Make Room for TV – Television and the Family Ideal in Postwar America*, Chicago, London, 1992.

[18] Between 1947 and 1953, the number of people living in the suburbs in the U.S. rose by 43 percent. See: Joan S. Rubin and Scott E. Casper (ed.): *The Oxford Encyclopedia of American Cultural and Intellectual History*, Oxford 2013, p. 454. The same tendency would start to emerge in Europe somewhat later.

[19] The deeper integration of the family would be repeated with the introduction of personal computers (PCs).



Fig. 6: Harold M. Lambert: A happy family cheerfully sits in their living room and watches a televised clown and puppet show, 1957.



Fig. 7: Nina Leen: Housewife ironing and watching TV, 1952.



Fig. 8: Francis Miller: A rapt audience in a Chicago bar watches the 1952 World Series between the Dodgers and Yankees, 1952.

lifestyle. TV viewers were typically portrayed in sentimental poses in the standard, ad-typical family circle as a household gathered around the living-room television set".[20] Only very few images portray a type of TV-watching that involves so-called *stay-at-home* individuals (Fig. 7).

As early as in the mid-1950s, one in every two households in the U.S. already had a TV set, which soon also became a go-to medium for current events, including sports and politics. Televisions could now be found in bars, pubs and drinking halls (Fig. 8) and quickly became standard equipment in hotels and motels as well.

In the U.S., televisions soon also became decisive for the manner in which politics and other national events were perceived. "The searching eye of the television camera scrutinizes the candidates-and the way they are picked", wrote Senator John F. Kennedy in 1959, one year before his election as president. "Party leaders are less willing to run roughshod over the voters' wishes and hand-pick an unknown, unappealing or unpopular in the traditional 'smoke-filled room' when millions of voters are watching, comparing and remembering".[21] The first presidential debate

[20] Spigel, Lynn: "Medienhaushalte. Damals und heute", in: *Zeitschrift für Medienwissenschaft*, 9/2 (2013), pp. 79–94.

[21] John F. Kennedy: "A Force That Has Changed the Political Scene", in: *TV Guide Magazine*, November 14, 1959.



Fig. 9: Paley Matters: A typical American family gathered around the TV, which displays John F. Kennedy's face, to watch the debate between Kennedy and Richard Nixon during presidential election, 1960.

on September 26, 1960 between JFK and Richard Nixon became one such event, attracting TV audiences of roughly 70 million in the U.S.

Nicholas Mirzoeff draws on McLuhan to describe the brief "global village" phase that began at this point:

> The period of the global village was, in retrospect, quite short. It extended from the death of Kennedy to the 9/11 attacks. In this period global television audiences watched dramatic events like the first moon landing (1969), the wedding if Charles and Diana (1981), the fall of the Berlin Wall (1989) and the 9/11 attacks (2001). So in the course of just fifty years watching a world-changing event became a routine consequence of technology, available to hundreds of millions of people who might have little understanding of how technology works. People who were alive at the time can all recall TV broadcasts when President Kennedy was killed, or the 9/11 attacks occurred. Today, news breaks as much through Facebook, Reddit, Twitter and other such applications as it does through television bulletins. Media no longer prize form so much as content.[22]

[22] Nicholas Mirzoeff: *How to See the World*, Penguin Books 2015, p. 148.



Fig. 10: Jacques Lowe: John F. Kennedy, with his brother Robert and Robert's wife, Ethel, behind him, watching election coverage at Hyannis Port, Mass., on the morning of Nov. 9, 1960.

In the 1950s, fine-art photographers also began to turn their attention to screens. These screens had become commonplace in a media environment that McLuhan encapsulated in one of his most well-known phrases: "Any understanding of social and cultural change is impossible without a knowledge of the way media work as environments".[23] At another point in the text, he also writes: "Environments are not passive wrappings, but are, rather, active processes which are invisible. The ground rules, pervasive structure, and over-all patterns of environments elude easy perception".[24]

Among the first photographers with an eye for the active environment of the screen was Robert Frank, who created a series of photographs in which televisions play a prominent role. His two best-known photographs

[23] Marshall McLuhan and Quentin Fiore: *The Medium is the Massage*, New York 1967, p. 26.
[24] Ibid., p. 69.



Fig. 11–12: Robert Frank: *The Americans*, 1958.

can be found in a book first published in 1958 in France under the title *Les Américains*: "With these photographs, I have attempted to show a cross-section of the American population," wrote Frank. "My effort was to express it simply and without confusion".[25]

One of Frank's photographs shows a switched-on television, on which we see Oral Roberts, the first TV evangelist, preaching to an empty café. The other shows a TV studio in which the presenter, who has been pushed to the left side of the image, almost disappears behind a dark shadow, while her likeness, limited to her face, is prominently displayed on a video control monitor to the right.

Both images are characterised by the appearance of faces on screens. Here, the new medium's unique kind of invasiveness becomes visible; these are faces that invade spaces and occupy them from that point on – if necessary, without the presence of any viewers.[26] Yet another, albeit less well-known image from the same period shows Robert Frank's children, Pablo and Andrea, directly in front of the television, engrossed in a cartoon (Fig. 13). Above the TV hangs a framed image of two icons of classic American cinema (Rock Hudson and Vivien Leigh), who now find themselves in a precarious situation in which they've been pushed out by the television. Of course, one could interpret these images as a critique of the new medium of television. But what they also show – in a completely unspectacular and rather casual manner – is a technology in the contexts of its use, that is, as normal as music boxes and radios, and as *(home-)entertainment*. We also notice in them a sense of uncertainty with regard to the role of photography and, more generally, the *old*

[25] Robert Frank: "A Statement", in: *U.S. Camera Annual* (1958), p. 115.

[26] Fifty years later, with the advent of the built-in laptop webcam, this type of invasiveness would be newly thematised and perceived as a form of monitoring or surveillance. Indeed, there is a reason why many users put some kind of tape or sticker over these cameras today.



Fig. 13: Robert Frank: *Andrea and Pablo*, 1955–56.

media of radio, film and photography. The competition between them is addressed directly in the image.

Five years later, starting in 1961,[27] Lee Friedlander began taking a series of photographs titled *The Little Screens*, which focus entirely on this uncertainty. These are photos of American living rooms and bedrooms which, much like Frank's TV photos, present images on screens – predominantly faces – that appear to invade sparsely furnished domestic environments void of any human beings, which thereby take on an urgent presence in the photographs.

In his short introduction to the first publication of *The Little Screens* in *Harper's Bazaar* in 1963, Walker Evans wrote the following about these faces: "It just so happens that the wan reflected light from home television boxes casts an unearthly pall over the quotidian objects and accoutrements we all live with. This electronic pallor etiolates our bed boards and pincushions, our mute scratch pads and our inglorious pill-boxes. It is half-light we never notice, as though we were dumb struck by those very luminous screens we profess to disdain. That disdain is

[27] First published in *Harper's Bazaar* in February 1963, accompanied by a text written by Walker Evans, and then again many decades later in 2001 in a book issued by the Fraenkel Gallery.



Fig. 14: Lee Friedlander: *Philadelphia* (from *The Little Screens*), 1961.

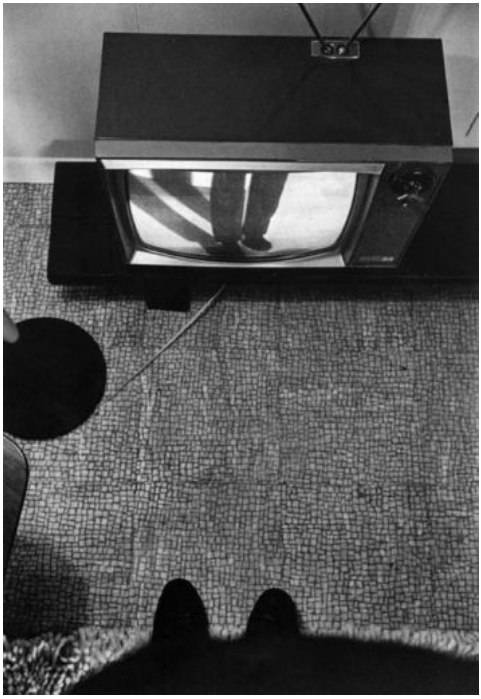


Fig. 15: Lee Friedlander: *Pennsylvania* (from *The Little Screens*), 1969.

mitigated by Friedlander's selective potshots. What are these faces that moon out of the screen?"[28]

There are only a few exceptions to this pictorial agenda in *The Little Screens*. One is an idiosyncratic self-portrait in which the camera is aimed at the floor in a spectacular turn, showing only the photographer's legs and feet, which find their uncanny *reflection* in the TV.[29]

One could read this image as a culmination of Foucault's phrase:

> The mirror is, after all, a utopia, since it is a placeless place. In the mirror, I see myself there where I am not, in an unreal, virtual space that opens up behind the surface; I am there where I am not, a sort of shadow that gives my own visibility to myself, that enables me to see myself there where I am absent: such is the utopia of the mirror.[30]

In this image, the television embodies the utopia of the electronic mirror, which will first come to fruition in the computer.

Only a few years later, the theme of the television-as-mirror would return – this time in colour – in the work of Stephen Shore. In his *American Surfaces* (1972/73) and other photographs from the early 1970s, images of televisions in motels and hotels, often showing faces, are a recurring motif. However, there is a new element here; in addition to the new colour, there is also a new environment that begins to be reflected in these screens. While television sets continue to be key to the motif, their image – with its mirror-reflections – now starts to point to a materiality of the screen. The image on the screen no longer penetrates or occupies the pictured spaces – and thus also the photographs – in the same way as in the work of Frank and especially Friedlander. And it's not simply the case that a new pictorial space opens up in the image; in fact, the apparatuses actually relinquish a part of their presence to their surroundings. Their surface becomes visible. They are no longer depicted as intruders, but instead as something that surrounds. While Shore's image from Idaho Falls still exhibits a certain proximity to Friedlander's

[28] Walker Evans: *Harper's Bazaar* February (1963), p. 127.

[29] Martha Rosler describes Friedlander's photography as a subversive practice: "Within photography his work violated the dominant formal canons not by inattention but by systemic negation. High-art photography has had a tradition of being directed, by and large, toward some universal message. It had aimed to signify a transcendental statement through subtraction or rationalized arrangement of elements within the photographed space, dramatic lighting, expressive intensity of glance or gesture, exotic or culturally loaded subjects, and so on. If Friedlander uses these devices, it is only to subvert them, to expose their arbitrariness". Martha Rosler: *Decoys and Disruptions: Selected Writings*, 1975–2001, Boston 2004, p. 114.

[30] Michel Foucault: "Andere Räume", in: *zeitmitschrift. ästhetik & politik*, 1 (1990), pp. 4–15, here p. 10.





Fig. 16: Stephen Shore: *Room 125, Westbank Motel, Idaho Falls, Idaho, July 18, 1973.* | Fig. 17: Stephen Shore: *Stampeder Motel, Ontario, Oregon, July 19, 1973.*

self-portrait, the switched-off apparatus in the Ontario image,[31] in which the photographer is dimly reflected, is a turn towards the object status of the apparatus, which is depicted as standing dysfunctionally amid a collection of dead objects.

In 2008, Penelope Umbrico took this theme to a new level in a series of photographs she collected of televisions put up for sale on *Craigslist*. She cropped the images in such a way that the only thing depicted was the screen of the switched-off device. On these screens, we see the reflections of the people who took the pictures of the devices and posted them online for sale. Umbrico describes what becomes visible here as follows:

> I find gestures of intimate and private exposure, various states of undress, unmade beds, dirty laundry – all accessible to an entirely anonymous public. The source images that these prints come from are very small: it's likely that the seller has no idea that he or she is pictured there. But thinking about the promise, and ultimate absence, of intimacy that the internet fosters, I can't help thinking there's a subconscious undercurrent of exhibitionism here; a plea for attention.
> [...] It's like I'm invited into people's living-rooms and bedrooms to look at the TV they want to sell and there they are, with unmade bed, sometimes completely naked, reflected in the surface of a TV they no longer want. It's sad really – at one time the center of the family room, now rejected, the last picture of the TV that will exist holds on to a little ghostly image of its owner.... Or, the ghostly image is forever stuck in the machine its owner doesn't want.[32]

31 See also Stephan Günzel's essay on these two pictures in this volume.
32 Penelope Umbrico: no date, http://www.penelopeumbrico.net/index.php/tvs-from-craigslist/ (last seen: May 25, 2022).



Fig. 18–20: Penelope Umbrico: *TVs from Craigslist*, 2008.

The televisions here are nothing more than dead, up-for-sale apparatuses in which the reflection of the people selling them can be seen.

In 2012, in the course of her own extensive internet research, Lotte Reimann stumbled upon a phenomenon that likely appears unwittingly in Umbrico's work, namely *reflectoporn*. This is a photographic practice in which a person takes a picture of a reflecting object in a way that makes it possible for their naked or exposed image to appear in the reflection, thereby allowing them to post the image online unnoticed, for example on vending sites like eBay. It's a particular form of exhibitionism:

> Somehow the subject presented itself like the perfect project, people were using my own favorite methods of playing with fact and fiction; some bloggers or amateur photographers were pretending to have discovered a new fetish by posting 'found' images on their blogs – and me believing them. Finally, I went a step further and took some myself, putting them online, still in the hope of getting in touch with some real reflectoporn-fetishists. In vain…
> The only reaction I got was an 'your-eBay-account-is-suspended email' and I surrendered.[33]

In this context, the screen is a camouflage for a dark mirror, which will soon take on a new guise in the black surfaces and front cameras of smartphones.



Fig. 21–23: Lotte Reimann: *Reflectoporn*, 2012.

[33] Lotte Reimann: no date, http://www.lottereimann.de/reflections.html (last seen: May 25, 2022).

At Work

An essential object in the context of *in-front-of-the-screen images* is the image of types of labour associated with screens. For example, the earliest images of people working with screens are pictures taken of inventors posing in front of the screens, presenting them as the result of their research. These are images of scientific achievement that serve to establish the screen as a special object and also to advertise it as something desirable.

Pictures like these are usually staged, such as the image of Manfred von Ardenne, the inventor of electronic image transmission, in his laboratory in 1932. These photographs usually show people – men, that is – operating a technical device, more behind-the-screens than in front of them; indeed, the idea was to showcase the screens as a new technology. The screen itself often plays the role of protagonist next to its inventor.

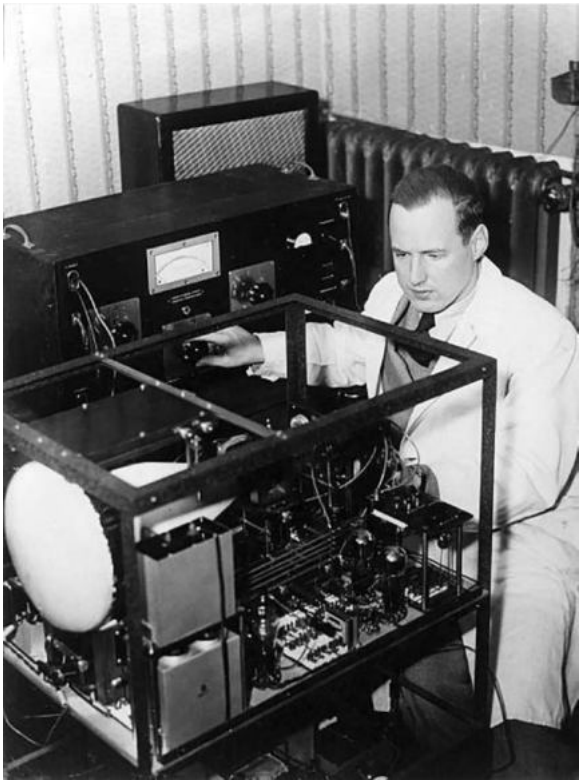


Fig. 24: Manfred von Ardenne, 1932.



Fig. 25: David Sarnoff, 1954.

In an image from 1954, we see David Sarnoff standing proudly in front of the first flat screen, which was invented by his company (RCA). On this flat screen is the image of Jane Russell, who was a leading Hollywood sex symbol at the time.[34] In this context, the technical object carries a double charge: it depicts TV as a technology made by white men but also, of course, as a technology that frames their specific *male gaze*[35] as a double desire.[36]

[34] Russell had contracts with RKO Pictures, of which Sarnoff was chairman for a time.

[35] "The subject can only play an active role vis-à-vis the camera or the gaze regime if it resists appropriation on the part of the images through which it – either willingly or unwillingly – allows itself to be 'photographed'. Only in this way can the subject deal with them in a transformative manner". Kaja Silverman: "Dem Blickregime begegnen", in: Christian Kravagna (ed.): *Privileg Blick – Kritik der visuellen Kultur*, Berlin 1997, pp. 41–64. See also: Laura Mulvey: "Visual Pleasure and Narrative Cinema", in: *screen* 16/3 (1975), pp. 6–18, here p. 11.

[36] A precursor of this type of image already exists in Albrecht Dürer's "Underweysung der Messung mit dem Zirckel und Richtscheyt" (Instructions for measuring with compass and ruler) from 1525. In a drawing titled "Draftsman making a perspective drawing of a reclining woman", Dürer shows a draftsman looking through a wooden frame, which has been outfitted with a grid, at a half-covered naked woman as a way of showing an ideal



Fig. 26: Steve Wozniak and Steve Jobs, 1976.

This state of affairs does not change in any real way even after 1976. At that time, however, Wozniak and Jobs were already in the process of constructing a digital computer – the prototype of the personal computer – that would decisively transform our relationship to screens.

With the establishment of computers, the type of work carried out behind screens changed rapidly into a servicing labour conducted with or at screens. Countless images of people sitting in front of screens and working with them bear witness to this. In a history of images depicting the work being carried out at or with screens, the images of women would have to be given a place of their own. Indeed, women are seen more often as objects on screens rather than as individuals in front of screens.[37]

set-up for perspective drawing. "The male protagonist is free to command the stage, a stage of spatial illusion in which he articulates the look and creates the action". Mulvey: "Visual Pleasure and Narrative Cinema", in: *screen* 16/3, op. cit., p. 13.

37 See, for example, Gordon Comstock: "Jennifer in paradise: the story of the first Photoshopped image", in: *The Guardian*, June 13, 2014, https://www.theguardian.com/artanddesign/photography-blog/2014/jun/13/photoshop-first-image-jennifer-in-paradise-




Fig. 27: Whirlwind MIT, 1949 | Fig. 28: Larry Tesler at his Xerox Alto workstation, 1973.

As is the case in many histories, images of women – that is, images showing women in positions of responsibility for some sort of development – tend to be underrepresented. In fact, only very few images show the production conditions associated with the early entertainment industry or women working on calculating machines.[38]

One of the few exceptions to this rule can be found in an April 1967 article titled "The Computer Girls" written by Lois Mandel and published in *Cosmopolitan* magazine.[39]

As late as in 1978, in an advertisement for the Apple II computer, the role ascribed to women is made explicitly clear (Fig. 31).[40] The man

photography-artefact-knoll-dullaart (last seen: May 25, 2022) and Benj Edwards: "The Never-Before-Told Story of the World's First Computer Art (It's a Sexy Dame)", in: *The Atlantic*, January 24, 2013, https://www.theatlantic.com/technology/archive/2013/01/the-never-before-told-story-of-the-worlds-first-computer-art-its-a-sexy-dame/267439/ (last seen: May 25, 2022).

38 In the U.S. in the mid-1950s, almost all of the people working in the electronics industry were female. Starting in the 1960s, the manufacturing sector moved to the countries of Latin America and Asia, where labour was much cheaper. This trend does not change with the manufacturing of computers as a new technology: for example, see Fairchild Industries, a computer chip manufacturer that employed female Navajos on a reservation to produce integrated circuits from the mid-1960s. See Bill Donovan: "50 Years Ago: The highs and lows of the Fairchild operation in Shiprock", in: *Navajo Times*, April 21, 2016, https://navajotimes.com/50years/50-years-ago-highs-lows-fairchild-operation-shiprock/ (last seen: May 25, 2022).

39 Lois Mandel: "The Computer Girls", in: *Cosmopolitan*, April (1967), pp. 52–56.

40 This depiction completely ignores the fact that up until the mid-1980s, nearly 40% of the people working in the field of computer sciences were women. It was only with the advent of the PC that the idea of the white male nerd became dominant. See Clive Thompson: "The Secret History of Women in Coding – Computer programming once had much better gender balance than it does today. What went wrong?", in: *The New York Times*, February 13, 2019, https://www.nytimes.com/2019/02/13/magazine/women-coding-computer-programming.html (last seen: May 25, 2022). Yet another blind spot in this narrative is the share of African-American women active in the context of the computer sciences. Starting in the 1950s, people like Katherine G. Johnson, Dorothy Vaughan, Melba Roy

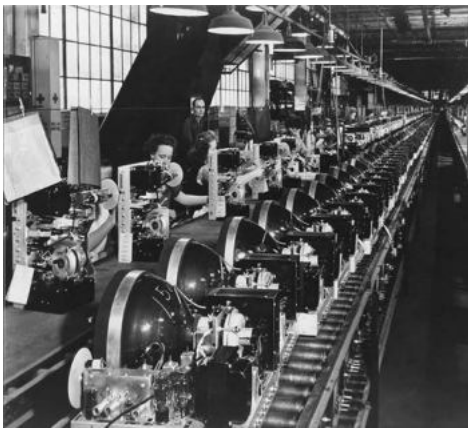




Fig. 29–30: A television chassis on an assembly line with women workers in a U.S. factory, July 1949. | "The Computer Girls" Cosmopolitan, April 1967.

of the house works confidently at a screen – which, incidentally, is still a television – in a highly modern kitchen, while his wife is seen in the background cutting *apples*.

There is one more thing, however, that this advertising image reveals: while the television generally had its fixed position in the living room, the PC had obviously not yet found its place. In the course of its subsequent conquest of the home, it became increasingly unlikely to stay in the kitchen. Here, at the very beginning of its career, its interim place in the home office had not yet been definitively determined. As Sophie Ehrmanntraut noted in her insightful study on the discourse history of the personal computer: "The PC was depicted as a friend of the family, something that helps children with their homework, allows parents to manage household expenses and brings the family together to play games. PCs were not portrayed as dictating what people should do or as setting any kinds of limits; instead, they were shown as empowering their users. [...] Companies had to lower their market expectations and users had to

Mouton, Mary Jackson and others played a significant role at NASA. See *Black Women in Computing*, no date, http://blackwomenincomputing.org/who-we-are/ (last seen: May 25, 2022). The percentage of African American women was and continues to be very low. See "African-American Women in Computer Science", in: *Wikipedia*, no date, https://en.wikipedia.org/wiki/African-American_women_in_computer_science (last seen: May 25, 2022).



Fig. 31: Apple ad, Byte Magazine, Jan. 1978.

adjust their expectations regarding the magical abilities of computers. Many laypersons had to first understand that computers don't simply do things on their own".[41] The idea of a computer as a machine that brings people together and can be easily operated without any special prior knowledge was developed further by Mark Weiser as part of the UbiComp Project at Xerox PARC:

> The program was at first envisioned only as a radical answer to what was wrong with the personal computer: too complex and hard to use; too demanding of attention; too isolating from other people and activities; and too dominating as it colonised our desktops and our lives. We wanted to put computing back in its place, to reposition it into the *environmental background*, to *concentrate on human-to-human interfaces* and less on human-to-computer ones.[42] [emphasis W. G.]

41 Sophie Ehrmanntraut: *Wie Computer heimisch wurden – Zur Diskursgeschichte des Personal Computers*, Bielefeld 2019, p. 152.

42 Mark Weiser, Rich Gold and John Seely Brown: "The origins of ubiquitous computing research at PARC in the late 1980s", in: *IBM Systems Journal* 38 (1999), pp. 693–696, here p. 693 f.



Fig. 32: Allan Sekula: *School is Factory*, 1978–80.

In other words, the goal was to make computers more integrated into everyday life in their capacity as *intelligent environments*.[43]

However, computers were already established as workplaces before the PC – with its initially unclear function – successfully entered the private space. We see this in particular in Lee Friedlander's *At Work / MIT Boston and vicinity* (1985–86), which contains images depicting the industrialisation of screen-based work. New forms of training for menial work at computer screens can also be seen in *School is Factory* (1978–80), Allan Sekula's critical study of the normative set-up of schools.

In this case, the process of training students to do keypunch work is depicted: "Two students look up from their machines. They are learning keypunch operation in a business information systems course. The junior college delivers a lot of students, mostly women, to surrounding corporations with a need for clerical and low-level computer workers. Keypunch is the lowest level of computer work, rivalling the assembly line in its brain-numbing routine".[44]

[43] See Mark Weiser: "The Computer for the 21st Century", in: *Scientific American* 265/3 (1991), pp. 94–104.

[44] Allan Sekula: "School is Factory" in his *Photography against the Grain – Essays and Photo-Works 1973-1983*, London 2016, pp. 199–234, here p. 203. It should be noted that this keypunch work was not carried out on an electronic display, but instead on a machine




Fig. 33–34: Lee Friedlander: At Work / Boston, 1985.

Some of Friedlander's images from the east coast's equivalent of Silicon Valley are shot frontally from the perspective of the screen, thereby presenting the screen as a counterpart that has the operator firmly in its sights.[45] At the same time, the images also depict the serial character of the open-plan office as the production site of a cognitive capitalism that places its workers in interchangeable modular environments.

A strange feeling of insecurity arises in us when we behold these images: Who is actually looking at whom? Indeed, it would appear that the human operators are the ones being monitored by the monitors. In turn, the meaning of the word monitor – from the Latin "someone who reminds, an admonisher, overseer" – is rendered in a special way here.[46]

created specifically for the purpose and which produced analogue paper output in the form of punch cards. See, for example, Frank Da Cruz: "The IBM 026 Key Punch", in: *Columbia University Computing History,* 2001, http://www.columbia.edu/cu/computinghistory/026.html (last seen: May 25, 2022).

45 This perspective appears on a regular basis in some recent photographic works. Such as, for example, in the work of Robbie Cooper: *Immersion*, which shows people sitting in front of computers at moments of great immersion in games, films, football matches or porn sites. https://robbiecooper.com/portfolio/immersion
Unfortunately, in some cases, people sitting opposite the screen are shown in a somewhat less differentiated way at moments of great dullness: Donna Stevens: *Idiot Box,* 2013, http://donnastevens.com.au/idiot-box/donna-stevens (last seen: May 25, 2022); Wolfram Hahn: *A disenchanted playroom,* 2006.

46 Contemporary images depicting work at the screen suggest a different image, one that seeks to avoid the distinction between work and leisure. These are images created by a 'New Economy' that propagates the inter-mingling of work, creativity and leisure. See, for example, the very pertinent promotional video made by Apple: *Behind the Mac*, July 10, 2018 https://www.youtube.com/watch?v=quppef3bH-s (last seen: May 25, 2022) and also the two recent versions which have a clear reference to a Covid-19-related home office set-up: Apple: *Behind the Mac – James Blake cuts his latest track at home*, Aug 10, 2020, https://www.youtube.com/watch?v=tzkT4RsJ5cY (last seen: May 25, 2022); Apple: *Tyler Mitchell – shoots his latest portrait series in his bedroom*, June 3, 2021, https://www.youtube.com/watch?v=zcMqAP790wM (last seen: May 25, 2022).



Fig. 35: Timm Rautert: *Mannesmann Kienzle*, 1981.

While photographer Timm Rautert depicts the visual-display-unit employees at Mannesmann-Kienzle (a German manufacturer of data processing equipment) working in a concentrated manner in a clean and highly ordered environment, Lars Tunbjörk shows the chaotic, materially overflowing character of these same workplaces. In doing so, Tunbjörk directs his gaze, on the one hand, to the environment the person creates for themselves in the office and, on the other, to the stress of the never-ending stream of data, which doesn't even make it possible for





Fig. 36–37: Lars Tunbjörk: *Office*, 2001.

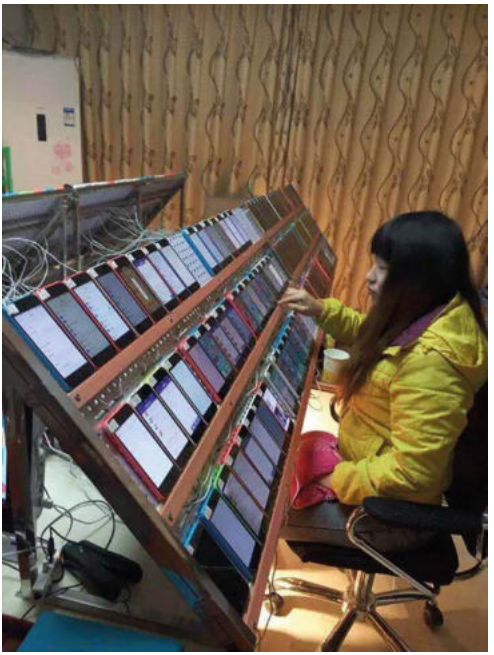


Fig. 38: Image of a Chinese click worker used in many posts exploring these kinds of working conditions. (Origin unknown.)

employees to remove old devices before being asked to interact with the next monitor.

This brings us to the flip side of the individualised, user-based programmes of today's global platforms, such as Instagram, Facebook, YouTube, Twitter, TikTok, etc. This flip-side realm is often populated by individuals who diversify their individuality on multiple screens for very low wages; their job is to click on website elements and thereby *artificially* elevate the status of the website of a client or a product.

Hundreds of thousands of these kinds of precarious "click jobs" associated with the invisible digital economy can be found around the world today.[47] These people are so-called "content moderators", whose job it is to weed out everything we the public should not encounter on social media platforms, for example, the scan operators at GoogleBooks and the

[47] These positions are usually filled by women from lower classes in Southeast Asia, with a focus on India, China and the Philippines, but also People of Colour in the U.S. at Amazon and Google. See, for example, the documentary film *The Cleaners* by Hans Block and Moritz Riesewieck (2019) and Ulrike Bergermann: "Digitus – Der letzte Finger", in: *ZFM Web Extra*, September 26, 2016, https://www.zfmedienwissenschaft.de/online/digitus#footnote10_fs4toip (last seen: May 25, 2022).

Mechanical Turks at Amazon. Jeff Bezos has euphemistically referred to this as "artificial artificial intelligence" and describes the concept behind Amazon's profitable business model as follows:

> Normally, a human makes a request of a computer, and the computer does the computation of the task, but artificial artificial intelligences like Mechanical Turk invert all that. The computer has a task that is easy for a human but extraordinarily hard for the computer. So instead of calling a computer service to perform the function, it calls a human.[48]

This is a type of work that labours in invisible ways to ensure the *functioning* of an energy-intensive digital reality, thereby helping to maintain its myth of purity and immateriality. And this is precisely what these images portray, namely that this work is not decoupled from life as "artificial artificial intelligence" and from an excessive materiality.[49]

The other precarious side of this *functioning* of digital reality can be found at the sites where these technologies are disposed of or *recycled*.

> Yet this waste is not exclusive to the production of electronics. Electronic waste moves and settles in circuits that span from manufacturing sites to recycling villages, landfills, and markets. Electronics often appear only as 'media,' or as interfaces, apparently lacking in material substance. Yet digital media materialize in distinctive ways – not just as raw matter, but also as performances of abundance – often because they are so seemingly immaterial. The elaborate infrastructures required for the manufacture and disposal of electronics can be easily overlooked, yet these spaces reveal the unexpected debris that is a by-product of the digital. The waste from digital devices effectively reorders our understanding of these media and their ecologies.[50]

[48] Jason Pontin: "Artificial Intelligence, With Help From the Humans", in: *New York Times*, March 25, 2007, https://www.nytimes.com/2007/03/25/business/yourmoney/25Stream.html?smid=tw-share (last seen: May 25, 2022).

[49] One of the most important components of this type of "functioning" in a pandemic world is that goods are able reach us without any resistance. Growth in this economy is closely linked to this world. In April 2020, for example, we heard very little about how Amazon employees went on strike over poor hygiene and distancing rules at Amazon distribution centres in the U.S. See Paul Blest: "Amazon Workers in New York Are Striking for the Second Week in a Row as Coronavirus Cases Pile Up", in: *Vice News*, April 6, 2020, https://www.vice.com/en_us/article/4age5j/amazon-workers-in-new-york-are-striking-for-the-second-week-in-a-row-as-coronavirus-cases-pile-up (last seen: May 25, 2022).

[50] Jennifer Gabrys: *Digital Rubbish. A Natural History of Electronics*, Ann Arbor 2011, p. 2. "The disposal of electronics, then, follows a trajectory between developed and developing countries, where devices migrate from technology rich regions to those places with an abundance of cheap labour and a high demand for raw materials. While countries such as China are currently regulating against the importation of electronic waste, shipments continue to make their way to Asia, Africa, and other developing countries for recycling and disposal." Ibid., p. 91.



Fig. 39–40: Nyaba Ouedraogo : *L'enfer du Cuivre*, 2011. | Kay Löffelbein: *CTRL X*, 2018.

These are the places where the materiality of electronic media is transformed – under extreme working conditions – back into matter. In their respective documentary works, Nyaba Ouedraogo (*L'enfer du Cuivre*) and Kay Löffelbein (*Ctrl-X. A topography of e-waste*) portray locations where the materiality of these devices is reduced to its raw materials – with radical consequences for human beings and the environment.

It is existential, economic and political conditions such as the ones shown here that prompt people to leave their home countries and embark on the dangerous voyage through the desert and across the sea. As photographer John Stanmeyer shows in his work, smartphones have now become important companions on these journeys, serving as tools of communication, orientation and navigation, but also as archives of memories (pictures from home) and as a means with which to document often perilous passages.[51] In certain cases, WiFi hotspots and access to cellular networks can be just as vital as water stations.

Tom Holert spotlights the key role played by smartphones for individuals fleeing their homes:

> Smartphones are irreplaceable instruments for the management of mobility under often life-threatening conditions. They ensure connectivity and contact with, for example, family members who are either back in their homeland or on their own refugee passage, but also with migrant communities in destina-

[51] This was proven empirically by the project *Flucht 2.0: Digitale Mediennutzung durch Flüchtlinge* by Martin Emmer, Carola Richter and Marlene Kunst: "Flucht 2.0: Digitale Mediennutzung durch Flüchtlinge", 2016, https://www.polsoz.fu-berlin.de/kommwiss/arbeitsstellen/mediennutzung/forschung/Flucht-2_0/index.html (last seen: May 25, 2022).



Fig. 41: John Stanmeyer: *Signal*, 2013.

> tion cities and the entire infrastructure of trans-local mobility, from smuggler organisations to immigration authorities. Most migrants have phones that allow them to access the internet and take photos, which means these devices have also become a means of production, dissemination and an archive for photographs and videos.[…]
> Beyond this, however, smartphones – and the manner in which they are used by refugees and migrants – are characterised by a specific ambivalence. On the one hand, they are iconic representatives of the reality of contemporary mobility: for example, images of refugees holding their mobile phones up in the air in search of a functioning cellular network have become a constituent part of the rich imagery associated with leading contemporary reportage photography. On the other hand, smartphones are also what makes it possible to monitor the paths and routes of migrants and refugees; they ensure their visibility for state and police authorities, because the signals emanating from the phones allow their movements to be traced using satellite-based localisation and navigation instruments. Re-tracing a route for monitoring purposes is the reverse equivalent of refugees and migrants projecting a route for their imminent migration. In other words, GPS not only makes monitoring migrant movement possible, it also enables the creation and use of cartographies of flight.[52]

[52] Tom Holert: "Sichtbarkeit und Navigation: Die neuen Bilder der Flucht", in: *Biennale* 2017, http://2017.biennalefotografie.de/edition/journal/bilder-der-flucht (last seen: May 25, 2022).

Work from home

As mentioned at the very beginning of this essay, the relationship of human beings to their screens changed during the Corona pandemic. While screens were now expected to protect us from infection, they simultaneously reconstituted, as Simon Strick noted,

> the interaction between body and machine in the paradigm of a smooth surface and a touch-free intimacy that makes any possibility of an illegitimate use and intrusion impossible. The interior of the technology – i. e. the code – is sealed off and immunised; its use becomes simple, personal, productive and non-invasive thanks to metaphorically touchable images (icons). The computing machine thus becomes – in the parlance of Apple – an actual personal computer. The interaction between personal computers and their users is as safe as it is intimate, and it takes place exclusively in a home-based environment away from any anonymous, invasive or manipulative agents.[53]

In this sense, our everyday computer counterpart is both a protection and an insurmountable surface. Any suggested closeness disappears behind the glass surface of the display. And the "visually mediated present presence"[54] remains no more than a form of social co-presence on the screen, one regulated by specific software conditions. Gazes that cannot meet one another.

> Sociality coded by technology [...] renders people's activities formal, manageable, and manipulable, enabling platforms to engineer the sociality in people's everyday routines.[55]

Or as Wendy Chun expressed it:

> Computers embody a certain logic of governing or steering through the increasingly complex world around us. By individuating us and also integrating us into a totality, their interfaces offer us a form of mapping, of storing files central to our seemingly sovereign – empowered – subjectivity. By interacting with these interfaces, we are also mapped.[56]

[53] Simon Strick: "The Straight Screen: Begradigungsarbeiten am iPhone", in: *Feministische Studien* 30/2 (2012), pp. 228–244, here: p. 234 f.

[54] Mikko Villi: "'Hey, I'm Here Right Now': Camera Phone Photographs and Mediated Presence", in: *Photographies* 8/1 (2015), pp. 3–22.

[55] José Van Dijck: *The Culture of Connectivity. A Critical History of Social Media*, Oxford, New York 2013, p. 12.

[56] Wendy Hui Kyong Chun: *Programmed Visions: Software and Memory*, Cambridge / Mass. 2011, p. 9.

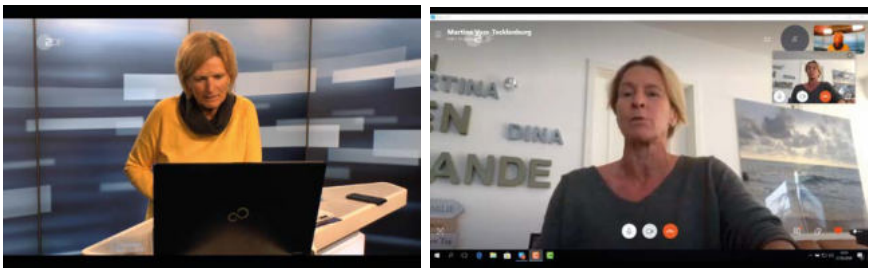


Fig. 42–43: ZDF reporter Claudia Neumann speaks to Martina Voss-Tecklenburg, Germany's national women's football coach, about the Corona crisis and its impact in a Skype interview, March 27, 2020.

In other words, these conditions are now regulated by Skype, Zoom, MS Teams, BigBlueButton, Jitsi[57] etc. In the process, we see the emergence of the image types mentioned at the beginning of this essay: that is, images of people turned with communicative intent to their screens and which are then used in various ways in the mainstream media. Always communicating the provisional aesthetic of the image.

Since the outbreak of the pandemic, images of interviews,[58] even in poor quality, have made their way into the newscasts of leading broadcasters; they now testify to a special urgency, actuality and authenticity that is similar to the shaky smartphone images that emerged several years ago:[59]

> The interviewees are almost always connected to the live broadcast via Skype. Their image is a bit shaky, we see most of them from a worm's-eye view, that is, from the chin up, but it works. We used to do everything we could to avoid poor-quality Skype links, but now we've already gotten used to the aesthetics.[60]

[57] Like Amazon, these are the winners of this iteration of *disaster capitalism,* which involves the exploitation of a sudden crisis for private profit. See Naomie Klein: *The Shock Doctrine: The Rise of Disaster Capitalism*, Toronto 2007.

[58] The screenshots in the following section were taken by the author. These and similar images were also used in print media to illustrate everyday media life under pandemic conditions.

[59] For this, see Elke Grittmann: "Fotojournalismus und journalistische Bildkommunikation in der digitalen Ära", in: Katharina Lobinger (ed.): *Handbuch Visuelle Kommunikationsforschung. Springer Reference Sozialwissenschaften*, Wiesbaden 2018; und Bernd Krämer and Katharina Lobinger: "So und nicht anders is es gewesen! Visuelle Authentizitäten und die Rolle kontextspezifischer Authentizitätsmarker in der visuellen Kommunikation", in: Katharina Lobinger (ed.): *Handbuch Visuelle Kommunikationsforschung. Springer Reference Sozialwissenschaften*, Wiesbaden 2018.

[60] Katharina Fiedler: "Das Fernsehen in der Coronakrise 'Wir wollen senden – egal was passiert'", *Tagesspiegel*, March 30, 2020, https://www.tagesspiegel.de/themen/reportage/das-fernsehen-in-der-coronakrise-wir-wollen-senden-egal-was-passiert/25690622.html (last seen: May 25, 2022).





Fig. 44 and 45: The German talk show "Dunja Hayali" on August 13, 2020.



Fig. 46: Germany's "NDR Talk Show" – The video link version, March 20, 2020.

In talk show formats, these images are used in place of the presence of interviewees in the actual studio. They are sometimes staged in such a way that a monitor is set up to embody the interviewee, which is then streamed into households in a kind of doubled tele-presence.[61]

Yet another image type that became widespread in the current crisis involves depictions of governing. These images are designed to provide reassuring portrayals of leaders and to show audiences that the political sphere continues to function, even though members of the government are not able to meet in person. While photographs of the world's most powerful individuals usually try to show them from a head-on perspective in flattering and representative settings, Covid-era images of governing suggest that the less attractive, from-behind perspective – with the person's simultaneous appearance on a screen in front of them – is sufficient to portray a head of state.

[61] This is evidence of the often invoked phrase that *we are all equal* before the virus. This phrase is, of course, not true, for many different reasons.



Fig. 47: Boris Johnson in a video conference with the g20 Image: EPA, March 27, 2020.

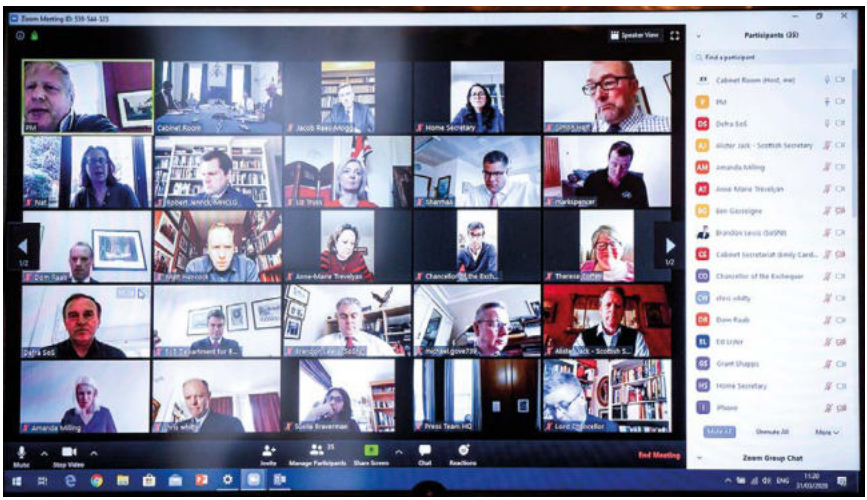


Fig. 48: Boris Johnson's screenshot of his "first cabinet meeting on Zoom", which he then posted on Twitter, March 31, 2020.

One example that proves we should not expect politicians to fully grasp the new technology or maintain an overview of things during the crisis is an image posted on Twitter (Fig. 48) by Boris Johnson on March 31, 2020: "This morning I chaired the first ever digital cabinet", he wrote.[62] In tweeting this screenshot, he unintentionally exhibited the other participants in their private environments and revealed the ID of the cabinet's Zoom conference in real time. Johnson's spontaneous post exudes a sense of pride in his *mastery of the digital*. However, the image also points to something else, namely the issue of self-representation in video conferences.

While the form of self-display at the beginning of the pandemic appeared to be entirely provisional and un-staged, even among government representatives, this starts to change in the course of 2020. The gaze into the mirror image of the computer will eventually trigger the need to pay more attention to one's own environment and the position of one's own camera.[63] Indeed, the more the self-image becomes necessary in everyday work life, the more professional-looking that same image becomes in video conferences. The nature and occasion of the conversation can also lead people to engage in a performative handling of their self-display: for example, someone might soften or completely fade out the background using an algorithm, or they might use a filter[64] to change the appearance of their face, etc.

This type of self-(re-)presentation or "presentification" has much to do with the prevalence of the selfie[65] and its various forms of communication. In the case of selfies, the staging of the face and body in front of a chosen picturesque background is a key essential feature. What makes the type of self-representation involved in a selfie different from the type of self-representation associated with video conferences, however, is that these conferences usually involve a laptop camera, which is linked to a screen that is not as mobile as that of a smartphone. And yet, as far as

62 https://twitter.com/BorisJohnson/status/1244985949534199808.

63 For this, see: Doreen Mende: "The live-stream's split-screen, or, Urgent domestic politics", in: *Rosa Mercedes* 2, April 5, 2020, https://www.harun-farocki-institut.org/en/2020/04/05/the-live-streams-split-screen-or-urgent-domestic-politics-2/ (last seen: May 25, 2022).

64 It's possible, for example, to integrate *funny* filters from Snapchat into certain video conference software.

65 The selfie is, of course, also an *in-front-of-the-screen image*, but any discussion of it would be so comprehensive that I deliberately exclude this type of image here. The aspect of 'presentifying' oneself quasi simultaneously via connected cameras is an essential aspect of this type of communication. See, for example, Mikko Villi: "The Camera Phone as a Connected Camera", in: Alexandra Moschovi, Carol McKay and Arabella Plouviez (ed.): *The Versatile Image: Photography, Digital Technologies and the Internet*, Leuven 2013, pp. 87–106. See also: Mikko Villi: "'Hey, I'm Here Right Now': Camera Phone Photographs and Mediated Presence", in: *Photographies* 8/1, op. cit., pp. 3–22.

I am concerned, the selfie experience still plays an essential role. I look at myself as if looking at another:

> Since photography is first of all dependent on its apparatus and then, only in a secondary manner, on the body of the photographer, it allows for views of the self to be severed from the body and framed from an external point of view, one that others may just as well occupy.[66]

The notion that I and others take on the same perspective is key for the self-image in video conferences. In contrast to the production of a selfie, I see myself lined up in comparison with others in the two-dimensional, tile-shaped grid[67] that is created by whatever software is being used. The relationship to a *screen-based device* during the video conference is described by Sabine Wirth in the following way:

> Furthermore, the selfie act includes certain knowledge of the operativity of user interfaces as well as a habitualization of media gestures. Taking a selfie encompasses practices like positioning one's body in relation to a screen-based device, fitting oneself into the framework of the smartphone screen, posing, smiling / not-smiling, checking for different angles and backgrounds, using the photo editing parameters provided by the smartphone [of the laptop of the tablets etc. – W. G.] interface zooming in and out, using filters, playing around with formats and app functions – in short: operating a user interface. Thus, the act of taking a picture is on the one hand a performance of and between photographer, camera, and the photographed object – or in the case of the selfie between photographer and screen interface.[68]

In the context of linked, camera-based communication, the connection between photographer and recipient has more often been depicted as a production of presence via mediality and technology,[69] that is, as an expression of a culture of *being there*.[70] In the real-time mode of camera-

66 Hagi Kenaan: "The Selfie and the Face", in: Julia Eckel, Jens Ruchatz and Sabine Wirth (ed.): *Exploring the Selfie*, Cham 2018, pp. 67–77, here p. 72.

67 For more on the problem of two-dimensionality in video conference tools such as Zoom, see: John Palmer: *Spatial Interfaces*, 30 August 2019, https://darkblueheaven.com/spatialinterfaces/ (last seen: May 25, 2022); And, relating to Covid 19: *Spatial Software*, April 9, 2020, https://darkblueheaven.com/spatialsoftware/ (last seen: May 25, 2022).

68 Sabine Wirth: "Interfacing the Self – Smartphone Snaps and the Temporality of the Selfie", in: Julia Eckel, Jens Ruchatz and Sabine Wirth (ed.): *Exploring the Selfie*, Cham 2018, pp. 125–138, here p. 132.

69 See Jan Distelmeyer: "IT sees: Speculations on the Technologization of the View and its Distribution", in: Winfried Gerling and Florian Krautkrämer (ed.): *Versatile Images – Looking at the GoPro Movement*, Berlin 2021.

70 Philipp Vannini and Lindsay M. Steward: "The GoPro Gaze", in: *Cultural Geographies* 24/1 (2017), pp. 149–155, here p. 152.

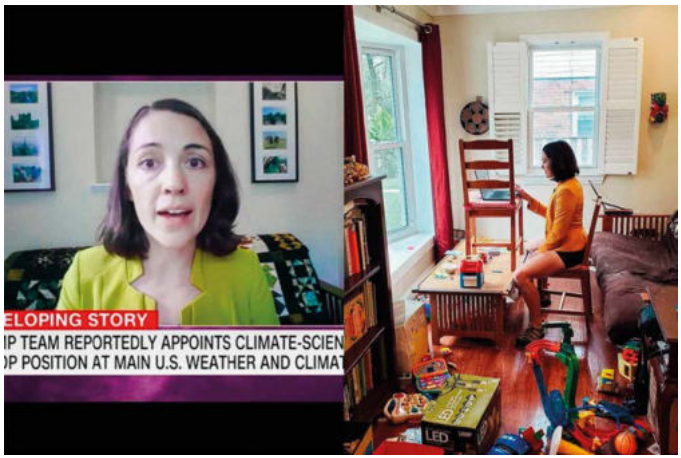


Fig. 49: Gretchen Goldmann during a CNN interview, photographed by her husband, September 15, 2020.

based video conferences, however, it can be described as *being with*,[71] which, in contrast, is a reciprocal relationship.

In contrast to Friedlander's photographs, the faces here are actual intruders into the personal or private sphere. Whereas in the case of public presentations in the physical space, it is always only the desk (-backdrop) of the respective computer that is ever revealed, here, in contrast, the physical background space behind the desk is actually in the image and either wants to be presented as it is or undergo some kind of digital *improvement*.[72] And, of course, everything that lies outside the field of view is always deliberately hidden.[73]

Being with thus also means: I am aware that I am *there* on the screen and that I am in an active relationship of negotiation with my counterpart. This acknowledges the fact that it is possible to be active over great distances and to enter into an interactive relationship – one that is regulated

[71] This becomes especially apparent when a mobile phone is carried through different rooms as a way of giving the other person an impression of the space the person is in.

[72] "Backgrounds by IKEA – The collection of backgrounds to get inspired in times of video calls", no date, https://www.ikea.com/sa/en/campaigns/backgrounds-by-ikea-pub-83ceffc0, (last seen: May 2, 2021); Benedikt Bucher: "Zoom Hintergrundbilder kostenlos zum Download – Die coolsten Hintergründe für die nächste Videokonferenz", in: *Chip*, September 9, 2021, https://www.chip.de/artikel/Zoom-die-coolsten-Hintergruende-zum-Download-gratis_182740998.html (last seen: May 25, 2022).

[73] "If I don't have to do something, I'm not going to do it. Like changing into pants," quote taken from Schwedel, Heather: "An Interview With the Scientist and Mom Who Had a Little Secret During Her CNN Appearance", in: *Slate*, September 17, 2020, https://slate.com/human-interest/2020/09/cnn-mom-pants-interview.html (last seen: May 25, 2022).

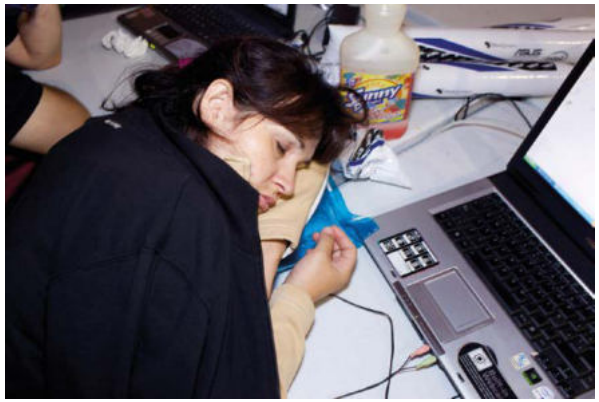


Fig. 50: Roc Herms: *<YO><YO><YO> – A trip from the plug into the computer*, 2015.

by technology – with the physical world. It is a function of the networked computer's software that photographers had to use to a greater extent during the pandemic in order to be able to carry out professional photo shoots at a safe distance and thus maintain their incomes.[74]

With any luck, this essay has shown that it is possible to use photographs to tell the story of human interaction with electronic screen media.

It is the story of *media media witnessing*, as one might call it in a reinterpretation of the concept introduced by Paul Frosh and Ahmid Pinchevski.[75] Indeed, these photographs bear witness to the coming-into-being of a medium in a more or less domestic environment, whose spatial perforation began with television, which then experienced a temporary highpoint with the reciprocal real-time transmission of human faces, and which now makes any clear distinction between work and private spheres increasingly problematic.

[74] Grace Z. Li: "A Photographer's Guide to Creating Portraits From a Distance. Visual artists are working from home – with help from FaceTime and Zoom", in: *Atlas Obscura*, April 28, 2020, https://www.atlasobscura.com/articles/remote-photography-over-zoom (last seen: May 25, 2022), and Theresa Hein: "Um sechs Uhr morgens saß ich da und hab den Lautsprecher angebrüllt", in: *sueddetsche.de*, June 17, 2020, https://www.sueddeutsche.de/kultur/corona-zoom-fotografie-1.4934958 (last seen: May 25, 2022).

[75] Paul Frosh and Amit Pinchevski: "Introduction. Why Media Witnessing? Why Now!", in: Ibid. (ed.): *Media Witnessing. Testimony in the Age of Mass Communication*, London / New York 2009, pp. 1–18.

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Three Probes into Recent History

Michael Schäfer

In all three works, one half of the image consists of a screenshot of an internet video, while the other half is a photograph taken by myself at the site of the incident some time after it occurred. Both parts of the image – taken at different times but from an identical point of view – collide in the horizontal center of the image. The technically „poor" image from the cell phone camera collides with the detailed realism of the more recent photograph.

The images are presented in lightboxes measuring 146.5 x 99 cm each.



Husarenhof (Bautzen, Feb. 21, 2016), 2017

On the night of February 21, 2016, the roof of the former Hotel Husarenhof in Bautzen, eastern Saxony, caught fire. The building had been scheduled to serve as a shelter for 300 refugees. A crowd of roughly 20 to 30 onlookers, some of them intoxicated, cheered the fire. Some of the bystanders also obstructed firefighters' efforts to put out the fire. The individuals responsible for starting the fire have not yet been identified. Across Germany, assaults on refugees and attacks on refugee shelters are still commonplace.


HOTEL
PALACE
BZ

Breitscheidplatz (Berlin, Dec. 19, 2016), 2017

On the evening of December 19, 2017, Anis Amri drove a semi-trailer truck into the Christmas market at the Kaiser Wilhelm Memorial Church in Berlin – killing 11 people and injuring 67, some seriously. Prior to the attack, Amri had killed the driver of the truck. Amri was able to flee the scene, but was shot dead four days later, on Dec. 23, by Italian police officers near Milan. That same day, the IS released a video that had been recorded several weeks earlier in which Amri pledged allegiance to Abu Bakr al-Baghdadi. The Christmas market reopened already on Dec. 22.



Charlottesville (Aug. 12, 2017), 2018

On August 11–12, 2017, the largest gathering in decades of far-right groups in the United States took place in Charlottesville, VA. The reason for their demonstration was to protest the city council's decision to dismantle the Robert E. Lee Monument in the centre of the city. Lee was a Confederate general during the American Civil War and thus considered a defender of slavery and an advocate of a racist worldview. On the morning of August 12, right-wing groups clashed with counterdemonstrators, some of them violently. After the demonstration was dispersed, at around 2 p.m., a 20-year-old right-wing extremist who'd traveled to Charlottesville from Ohio plowed his car into a group of counterdemonstrators who were walking to the parking garage. A young woman was killed and five other people were seriously injured. The perpetrator was sentenced to life in prison in 2019. It was not until nearly four years after the events, on July 10, 2021, that the Robert E. Lee Monument was dismantled.

Image Reflection: Television-Screen Photography

Stephan Günzel

This essay explores the question of in what way photography can be used as a theoretical tool to reflect on the nature of images. In essence, it is an approach derived from media theory in the tradition of Marshall McLuhan, who argued that the *content* of any medium is always another medium, rather than a message free from any medial *form*. Consequently, a theory reflecting media must also be bound to medial forms – in this case, the written text. With this in mind, the following is an attempt to provide a complementary observation on a process that takes place in a specific medial relation, namely the one between photography and the television screen(s). Throughout the history of media, the latter has usually been seen as *containing* the former: cinematography incorporates photography and turns it into sequential shooting. Television then broadcasts the previously recorded moving images in a live situation, and so on. In contrast to mass media, however, the use of media by artists can reverse this situation in order to gain insights into the condition of medial *containment*: the message of an older medium can be a newer one. Photography can also contain the medial form of television, which is the screen. Using examples drawn from the history of artistic photography as well as from the history of painting, this essay will investigate the medial form of television screens by proceeding in seven steps: from *abstraction* by and *reflection* with photography to the *documentation*, *monitoring* and creation of *transparency* using the camera and, finally, to the creation of *presence* and *tele-vision* itself. An examination of these various layers will serve to highlight the multifaceted potential of the photographic medium. Likewise, this step-by-step approach will make it possible to shed light on the particular medial form under examination here.

I. Abstraction

The first question to be asked is whether the television-screen photographs I am referring to (and television-screen photographs in general) are abstractions or concretions. In other words, the goal is to ascertain whether these photographs belong to a category of avant-garde art pho-





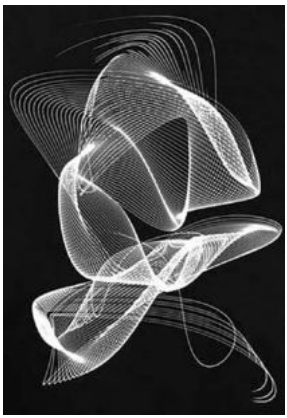
Fig. 1: Anonymous: *Leaf*, ca. 1839. | Fig. 2: Nicéphore Niépce: View from the Window at Le Gras, 1826.

tography that is not an imitation of painting – in contrast to classical art photography or so-called pictorialism – but rather a form of art that corresponds to the medium of photography and either abstracts from individual aspects of the photographic process[1] or concretely brings out the photographic as such.[2]

Every photograph is *abstract* per se, since it abstracts from space and time (i. e., it extracts a section or a moment of reality) as well as – in the case of black-and-white photography – from color (and basically from all non-visual sensory information). Photographs show a moment and a section of a spatiotemporal event, which is a defining characteristic of the "photographic act"in particular.[3]

However, not all photographs are *abstract* in the narrower sense, since they were taken by means of a lens and camera. They are therefore not photograms, which Thomas Wedgewood once called "shadow images" and Henry Fox Talbot referred to as "photogenic drawings". These photograms are considered the earliest form of abstraction, and one of their oldest surviving (albeit not chemically fixed) specimen dates from around 1839 (Fig. 1). In fact, the photogram technique may have been carried out much earlier, and it is entirely possible that photograms might have been produced even before the first photograph was taken with a camera

1 Gottfried Jäger (ed.): *The Art of Abstract Photography*, Stuttgart, New York 2002.
2 Gottfried Jäger, Rolf H. Krauss, Beate Reese (ed.): *Concrete Photography / Konkrete Fotografie*, Bielefeld 2005.
3 Philippe Dubois: *L'Acte photographique et autres essais*, Paris 1992.



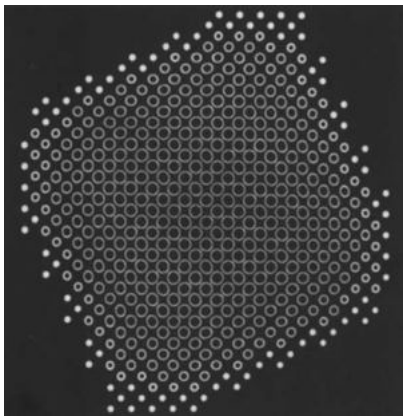


Fig. 3: Peter Keetman: *Schwingungsfigur 995*, 1949. | Fig. 4: Gottfried Jäger: *Lochblendenstruktur 3.8.14.D*, 1967.

obscura by Nicéphore Niépce in 1826 (Fig. 2). Indeed, Niépce himself produced heliographic copies of drawings without a camera prior to that.

As one can see in Niépce's famous example, what photographs also reveal is the fact that they were *photographed*. This is especially the case with Niépce's image, because it remediates Alberti's metaphor of the "open window" (*finestra aperta*) and therefore simultaneously demonstrates the difference between a realistic painting (in colour) and a photograph of a real situation (in black and white). Niepce's picture thus shows the object(s) that reflected light, which then caused a reaction in the bitumen on the photographic plate. In turn, realistic photographs are often used as indexical signs to refer to what has been the physical cause of the image. In contrast, in much of the abstract photography in the 20th century, such as Peter Keetman's light sculptures (Fig. 3), even though they may have been taken with a camera, the iconic result they produce is not used as an indexical reference to the cause of the picture.[4]

This would leave us with the possibility of understanding the images not as examples of abstract photography, but rather as instances of concrete photography; the latter is a direction in artistic photography that sometimes also includes works of abstract photography and, like photograms, are usually produced without a camera, but which, unlike photograms, show nothing other than the photo (material) itself. In

[4] See Lambert Wiesing's essay "What Could 'Abstract Photography' Be?" in his collection of studies: *Artificial Presence. Philosophical Studies in Image Theory*, Stanford 2010, pp. 60–67.





Fig. 5: Nam June Paik: *Magnet TV*, 1965. | Fig. 6: Wolf Vostell: *Sun in Your Head*, 1963.

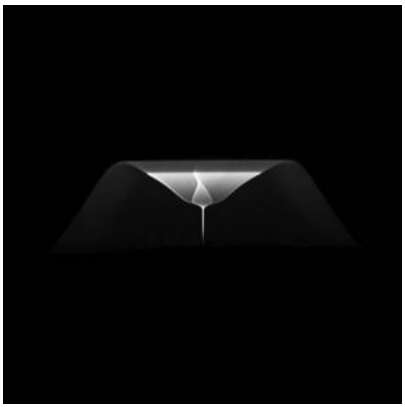
other words, concrete photographs don't have any iconic references, only indexical ones, as exemplified in the works of the Bielefeld-based photographer Gottfried Jäger (Fig. 4), who describes his form of art more precisely as *generative photography*.[5]

Indeed, in indexical terms, some photographs are traces of light events. For example, some images of televisions are taken with a camera whose indexical reference coincides with the iconic one to the extent that the light event is seen in its original form. Of course, television monitors can also be used to create abstract light figures, as video artist Nam June Paik did with the help of a magnet on black-and-white monitors (Fig. 5) and German sculptor Wolf Vostell with his 1963 "Television Decollage" *Sun in Your Head* (Fig. 6).

What Vostell's project has in common with the photographs of Stephan Tilmanns is that they both depict the image of a screen at the moment of shutdown (Fig. 7). Their shared characteristic is that the iconic image does not correspond to a pictorial event of perception beyond the image, but instead reveals (through abstraction, especially of time) the *optical unconscious* in the sense of Walter Benjamin's famous formulation.[6] This is achieved to the extent that the picture is able to present something that is completely inaccessible to perception, such

[5] Andreas Beaugrand (ed.): *Gottfried Jäger – Fotografie als generatives System. Bilder und Texte 1960–2007*, Bielefeld 2007.

[6] Walter Benjamin: "The Work of Art in the Age of Its Technological Reproducibility: Second Version", in: Michael W. Jennings, Brigid Doherty and Thomas Y. Levin (ed.): *The Work of Art in the Age of Its Technological Reproducibility and Other Writings on Media*, Cambridge / Mass., London 2008, pp. 9–55, here p. 37.



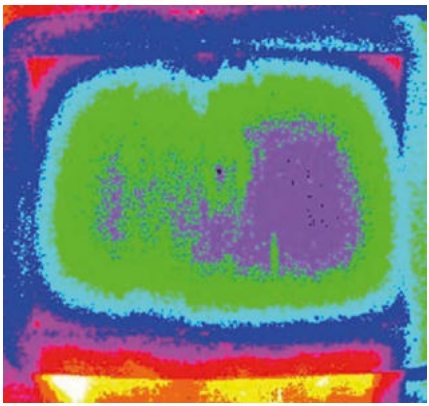


Fig. 7: Stephan Tillmanns: *Leuchtschichtformungen*, 2013. | Fig. 8: Günther Selichar: *standby #4*, 2003.

as in the infrared images of the standby mode of screens by Günther Selichar (Fig. 8). Just as in Tillmann's pictures, a moment is made visible that would otherwise not be seen or viewed in this way in the moving image.

II. Reflection

And yet, even with the conceivable proximity of the TV images to concrete photography, they are not concrete in the strict sense (that is, they do not expose the photographic material or the chemical reaction with the paper through the effect of light). At best, they are *concrete* in a broad sense, as they show nothing other than what is to be seen (on television). However, this form of concreteness would be metaphorical at most. More than concrete or abstract photography, some images must be said to belong to a group of images that can be called *reflective photography*. Reflective or self-reflective photography is related to meta-painting, which makes the process of painting itself a subject of discussion: for example, works by Diego Velázquez (Fig. 9) or René Magritte (Fig. 10).

In the history of photography, media self-reflexive images can be found at quite an early stage: for example, first in the image of the clown Pierrot *as photographer* by Nadar (Fig. 11) in the mid-19th century or in the self-portrait by Ilse Bing in the early 1930s (Fig. 12).

However, unlike these examples, some pictures do not reflect the medium of photography as representational camera shots; instead, they reflect another medium, namely television. One example of this approach





Fig. 9: Diego Velázquez: *Las Meninas*, 1565. | Fig. 10: René Magritte: *Clairvoyance*, 1936.





Fig. 11: Nadar: *Pierrot the Photographer*, 1854. | Fig. 12: Ilse Bing: *Self-Portrait in Mirrors*, 1931.

is a photograph by Helmut Newton called *After Velazquez*, in which the mirror of (self-)reflection (Fig. 13) is replaced by a television set (Fig. 14).

In general, reflection by means of photography can be achieved by reflecting on the self of the photographer, on the photographic apparatus or on another medium, as is the case in the television (screen) reflection in Newton's photo.[7] It may come as a surprise, but the origin of television

[7] Wulf Herzogenrath, Thomas W. Gaethgens, Sven Thomas and Peter Hoenisch (ed.): *TV-Kultur. Das Fernsehen in der Kunst seit 1879*, Amsterdam, Dresden 1997.





Fig. 13: Diego Velázquez: *La Venus del Espejo*, 1648–51. | Fig. 14: Helmut Newton: *After Velasquez in My Apartment*, 1981.

actually dates back almost to the beginning of photography. Indeed, the first public presentation of a daguerreotype took place in 1839 and is usually considered as marking the birth of photography. The first draft of a pictorial telegraph was available a mere four years later, in 1843, when the Scottish watchmaker Alexander Bain invented the telefax device (with which pictures were also transmitted starting in 1906), before having a recording method of telegraphic messages patented in 1849. The real inventor of tele-vision, however, was Paul Nipkow, who based it on the principle of two rotating discs in 1883.

III. Documentation

Nipkow's term "electric telescope" clearly shows what the medium was chiefly defined by, namely the transmission of images. This stands in contrast to photography, where the creation and storage of images was the main focus and where distribution took place solely to other media (especially newspapers). While the recording of images can indeed be a technical precondition of television (during transmission or reception), it is not part of its *essence*. Instead, television is much more defined by the *live* transmission of moving images and the *forgetting* of information, which is quite the opposite of the ontological memory value of photography as underscored by Roland Barthes in his concept of "that-has-been".[8]

Even though the different ways of image genesis in the analogue age are very different – indeed, photography works with the reaction of chemical materials, television with electrical transmission – a documentary style has nevertheless developed in both media due to the fact that

[8] Roland Barthes: *Camera Lucida. Reflections on Photography*, New York 1981, p. 77.




Fig. 15: Robert Capa: *D-Day Landings*, 1944. | Fig. 16: *Anonymous: Smart Phone Footage from Daraa, Syria*, 2011.

they are technical (apparatus-produced) images that primarily depict an extra-pictorial *reality*.[9] Although this style is usually different – in photography, black-and-white images stand for a higher level of reality, whereas in television this status is granted to color images – in both media, authenticity is guaranteed by blurriness.[10]

In photography, Robert Capa's pictures of the Allied landing in Normandy (Fig. 15) could be mentioned in this context. In the realm of TV, we could point to the broadcast of mobile phone camera shots from conflict areas (Fig. 16). In both cases, it's not so much the blur of movement (of the objects photographed) that determines the style, but rather the blur caused by the photographer (a camera shake in Capa's case, low resolution and/or also shaking in the case of mobile phone pictures), which these images also share with those of everyday mobile phone photography and mobile phone filming, in which proof of existence is the key objective.

Through blurredness the formal rhetoric of authenticity associated with photography is applied to television, making it appear inauthentic precisely insofar as the viewers now see the light events at the end device of the broadcast, but not the specific information of the broadcast. In this way, the photographs show a pure media event or the fabric of the images.

9 Bernd Stiegler: "Digitale Fotografie als epistemologischer Bruch und historische Wende", in: Lorenz Engell and Britta Neitzel (ed.): *Das Gesicht der Welt. Medien in der digitalen Kultur*, Munich 2004, pp. 105–125.

10 Wolfgang Ullrich: *Die Geschichte der Unschärfe*, Berlin 2002.



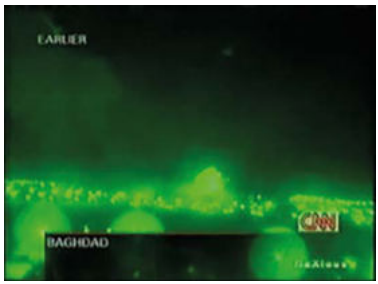


Fig. 17: Operator at a monitor of the SAGE computer system (in operation between 1963 and 1979) with light-pen to identify objects on the screen. | Fig. 18: Still image from CNN broadcast of the bombing of Baghdad in night-vision mode on January 19, 1991.

IV. Monitoring

In the digital age, the *making* and storage and distribution form of the data associated with both types of images is binary: numerical information underlies the pixel images of both the static images of photography and the moving images of television (and film).[11] The different types of images thus move closer together than in the analogue age, in which the image information on photographic paper was defined by the chemically induced graininess or the screening of the print, and in television by the lines of the image scanning or the bundles of dots of the tube screens.

The view of the dots on the cathode-ray tube-screen goes back to the origin of the monitor in the realm of radar (Fig. 17), where (in advance of the digital image) the individual pixels had to be precisely addressable for friend-foe distinction or recognition.[12] The viewer observes an observation medium that warns (lat. *monere*) the viewer. Admittedly, popular television is no longer used for military observations, but in a certain way it still distinguishes ideologically between friend and foe (image); in any case, the medium is observed (Fig. 18).

The technical genealogy according to the present observation is connected to the above-mentioned special mediality of the medium of television, which not only consists in a certain presence due to its function of transmission. It is precisely this – spoken with the Canadian

[11] Wolfgang Hagen: "Die Entropie der Fotografie. Skizzen zu einer Genealogie der digital-elektronischen Bildaufzeichnung", in: Herta Wolf (ed.): *Paradigma Fotografie*, *Fotokritik am Ende des fotografischen Zeitalters*, Volume 1, Frankfurt am Main 2002, pp. 195–235.

[12] Lev Manovich: "An Archeology of a Computer Screen", 1995, http://manovich.net/content/04-projects/011-archeology-of-a-computer-screen/09_article_1995.pdf (last seen: December 6, 2021).





Fig. 19: Monika Huber: *Einsdreißig*, 2011. | Fig. 20: Edward Steichen: *Figure with Iris*, 1902.

founder of the newer media theory Marshall McLuhan[13] – that is the most important common ground and simultaneously the key difference between photography and television: The TV – paradigmatically for all *new* (electronic) media – "engages you", you have to "be with it", whereas the "being *with* it" of photography does not require us to be present *live*, but simply to be *up to date*.

A possible self-reference of the pictures is thus a broken one: Here it is not one medium observing itself in the same medium – as in the case of video as the storage of a transmitted moving image[14] – but one medium observing another medium. Thus, not only are the technical-medial structures removed, but the structure of communication in general as well. It is almost the redemption of Jean Baudrillard's fatalistic diagnosis: "We don't need the media to reflect our problems in real time – *each existence is telepresent to itself*. TV ad media have left their mediatized space in order to invest 'real' life from the inside, infiltrating it exactly like a virus in a normal cell. We don't need digital gloves or a digital suit. As we are, we are moving around in the world as in a synthetic image."[15]

[13] Marshall McLuhan: *Understanding Media. The Extensions of Man*, Cambridge / Mass., London 1994, p. 312 and p. 169.
[14] Yvonne Spielmann: *Video. The Reflexive Medium*, Cambridge / Mass., London 2008.
[15] Jean Baudrillard: "Aesthetic Illusion and Virtual Reality", in: ibid.: *Art and Artefact*, ed. by Nicholas Zurbrugg, London 1997, pp. 19–27, here p. 19.

V. Transparency

In the mode of observing television through photography, there are again basically two conceivable approaches: one is transparency and the other opacity. The latter combines the medium with early efforts at the *pictorial*, i. e., artistic photography. Thus, the Munich-based artist Monika Huber alienates TV photographs (named after the one minute and thirty seconds of time each time a message is sent) in the style of the pictorialists of the penultimate turn of the century (Fig. 19), who subsequently processed negatives or positive prints and, for example, scratched the surface of the picture with a needle or painted over it with a brush (Fig. 20). Blurred TV photographs are aesthetically close to this.

However, some TV-screen images can be attributed above all to the other approach, namely that of transparency, in which the photographed television image is documented primarily as a surrogate for a recording of the (usually historical) event, and which, as a mere media event image – that is, as an image of the event, of which photography in turn provides an image – devalues that event itself and ultimately brings the world to a historical standstill.

The next logical step then is to move from the reflexive screen-photograph (Fig. 21) to the environment of the TV set. This is no longer an observation of the first order, but rather one of the second order: an observation of observation, for example, as shown by Evert Baumgardner's famous photograph of the family setting (Fig. 22), in which the TV set is now found where the radio used to be as the former media centre of the family (as was the case in Germany in the 1930s and 1940s with the *Volksempfänger* [literally "people's receiver"]).





Fig. 21: Stephan Günzel: *TV-Picture of the Landing of the Space Shuttle 'Columbia' after Its Second Mission*, 1981. | Fig. 22: Evert F. Baumgardner: *Family Watching Television*, ca. 1958.

VI. Presence

In this way, some works follow a direction in the photography of media environments, such as those by Lee Friedlander or Robert Frank, who themselves captured television situations on their trips through the USA – albeit situations in which the viewers were already absent. While Frank's photographs in *The Americans* – which was first published in French in 1958 and contained images from his 1955 trip to the United States – were intended to provide a description of the state of a nation (Fig. 23) and still show an almost *normal state* (although here, too, there are no longer any people as spectators and the television is no longer *on* for anyone), Friedlander's photographs taken in the following decade tend to emphasize the sur-reality of the artificial presence of television faces (Fig. 24).

It is no coincidence that these works emerged in an era in which media were no longer reflected only technically and no longer solely from their reception, but in which their environmental potential (i. e., the ecology of media) was increasingly coming into focus. Indeed, even before Neil Postman explained this in the 1980s in works such as *The Disappearance of Childhood*, media reality had been shown not *in* but *on* the screens of Frank and Friedlander.

Particularly noteworthy in this tradition are the TV images created by Stephen Shore. These are also photographs of entire settings (Fig. 25), but unlike Frank and Friedlander, the photographs are in colour, which at first seems to reduce the degree of abstraction, but ultimately only intensifies the unease. This is particularly evident in the juxtaposition of two pictures by Shore taken on consecutive days, one of which is a self-portrait in the style of Ernst Mach's *View from the Left Eye* in his 1886 publication *Analysis of Sensations*; accordingly, it shows a part of





Fig. 23: Robert Frank: *TV in Diner*, 1958. | Fig. 24: Lee Friedlander: *The Little Screens*, 1963.





Fig. 25: Stephen Shore: *Room 125, West Bank Motel, Idaho Falls, Idaho, July 18, 1973*. | Fig. 26: Stephen Shore: *Stampeder Motel, Ontario, Oregon, July 19, 1973*.

his own body (not looking through an Albertian window as in Mach, but rather watching the current television program).

In particular, the switched-off TV set, together with the panoramic photo wallpaper of a coastal landscape and the trophies of North American wildlife (Fig. 26), emphasizes the *naturalness* of the TV in the home. Just as the sea is only an image and animals are only shells that can no longer physically approach people and possibly cause them harm, so too the screen of the television – as an apparent place of the television's logics – is a protection or *shield* to the same extent as it provides a view of another world during operation.

VII. Television

Visions of a breakthrough of the protective shield have been increasingly seen in horror films since the 1980s (not to mention the dystopian sci-fi thriller *Videodrome* [David Cronenberg, Canada / USA 1983]). Other paradigmatic examples include the appearance of the creature that gives the film its title in *Poltergeist* (Tobe Hooper, USA 1982), which announces itself as a television set that switches on before it intervenes in the home from the TV set, or when the undead emerges from the picture frame in *The Ring* (Gore Verbinski, USA 2002), an adaptation of the Japanese original of the same name from 1998 shortly after the wave of fear associated with the *millennium bug*. Significantly, in each case, the character is a child (whose vulnerability is further increased because she's a girl), that is, a person in the period of life that Postman declared – in the very same year *Poltergeist* was released – to be doomed to disappear due to television (Fig. 27). Twenty years later, the




Fig. 27: *Poltergeist* (USA 1982) | Fig. 28: *The Ring* (USA 2002)

girl (Carol-Anne in *Poltergeist*, Samara in *The Ring*) is already a prisoner of the television world herself; to be more precise, she has become a video recording (Fig. 28).

However, not all works let the screen be so strikingly broken up; instead, they are more subtle. This can be seen in the many close-ups and detail shots with which, on the one hand, they are placed in the tradition of close-ups in the cinema and, on the other hand, the manner in which they deviate from it decisively. For one does not focus on a detail of the screen with the camera, but instead captures moments in which the television itself shows details. In classical cinema, close-ups have the function of depicting an inner – psychological – movement rather than an outer movement (Fig. 29), and the face shown subsequently becomes a projection surface for the viewer's interpretation of the inner process.

As a place for the face, the screen achieves its third function above and beyond protection and transparency. Instead of a face (Fig. 30), however, events, things or other parts of the body can also become a projection screen for the wishes of the audience. Frank, Friedlander and Shore pursue what can be called "visual sociology", which is ultimately

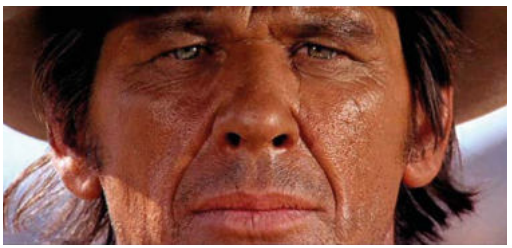



Fig. 29: Still from *Once Upon a Time in the West* (Sergio Leone, Italy / USA, 1968). | Fig. 30: Stephan Günzel: *Detail of the TV-Broadcast of "A Chinese Ghost Story", HK 1987*, 1996.

also the field from which the term "reflexive photography" originates.[16] However, the subject of sociological investigation is not the behavior of media users, but rather the environment that the medium produces in terms of its mediality, namely watching television.

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[16] Douglas Harper: "Visual Sociology. Expanding Sociological Vision", in: *The American Sociologist* 19/1 (1988), pp. 54–70.

Everything Starts to Shake: Gameplay, Shutter Lag and Fugitivity

Rowan Lear

When I run, everything starts to shake. Street furniture, buildings and cars begin to shudder up and down, dropping their grip on gravity. On hard surfaces the illusion intensifies, as if I've been flung inside a frenzied film projector. Lampposts and trees and other people vibrate skywards around me. This phenomenon has a name: oscillopsia.

***

My first video game seemed to be perpetually on the move. Set in a nostalgic, mythic version of Miami, Grand Theft Auto: Vice City sent its protagonist Tommy Vercetti to establish mob dominance in the city's criminal underworld.[1] It was a game organised by missions, dirty deals, vehicle theft, violence and ogling women. The ironic tone struck by frequent exposition told through entertaining dialogue sequences harboured a host of harmful stereotypes. Underpinning most of the game's interactions, racism and misogyny were possibly more pernicious than the random, excessive violence over which parents and licensors fretted. Alienated by and frankly disinterested in the unfolding narrative, what I remember most about playing the game was a sense of perpetual fugitivity.

Like other players, I found myself in control of an avatar with free rein to explore a fully fleshed and lively game universe. The contrived missions were less enticing than roaming this cityscape at will. Run, turn, jump, land a punch, dodge a bullet, drive. Just keep moving. You were always on the run, yet – thanks to the third person perspective which positioned the player behind and above the head of the avatar – also the pursuer. As Fred Moten and Stefano Harney suggest: "Some people want to run things, other things want to run".[2] GTA Vice City offered both.

Over the years, artists mining GTA as material have picked up on this desire for flight woven into the game logic. In the video work *Finding Fanon II* (2015), artists Larry Achiampong and David Blandy traverse a ruined GTA5 landscape to the beat of a voiceover informed by the radi-

1 *Grand Theft Auto: Vice City* (2002), Rockstar Games, Microsoft Windows.

2 Stefano Harney and Fred Moten: *The Undercommons: Fugitive Planning & Black Study*, Wivenhoe 2013, p. 51.

cal postcolonial critique of Franz Fanon. Rather than play out the game and fulfil their missions, their two avatars walk, stride and take stock at the game's forgotten and unpeopled edges.[3] For Fred Moten: "Fugitivity, then, is a desire for and a spirit of escape and transgression of the proper and the proposed. It's a desire for the outside, for a playing or being outside, an outlaw edge proper to the now always already improper voice or instrument".[4] Is such a fugitivity possible inside GTA, or has something that merely resembles it been hardwired in?

***

Oscillopsia is the sensation that the world around you is fundamentally unstable. First recorded in 1936, the main symptom observed was an oscillating vision, often triggered by certain actions like walking, running or driving. In a 1965 article, this blurring of vision with movement was described by a patient as the "bobbing, dancing, jumping, or shimmering of a viewed object which can't stand still and is all mixed up".[5] Proposed causes of oscillopsia range from mechanical eye misalignment to brain injury to the damage of hairs in the inner ear caused by aminoglycoside antibiotics or meningitis. Oscillopsia thus not only muddles the external world seen by the moving person, but also exposes the complex creature that is our sensory apparatus. As Michel Serres put it, our senses are "unstable also because they are mingled: [...] the chaotic whirlpools of the senses never achieve singularity, conservation or identity".[6]

Our ears and eyes are intimately connected by a sheath of nerves, providing our bodies with in-built image stabilisation. This 'vestibulo-ocular reflex' works to track head movement and make appropriate adjustments to eye focus. The plastic brain is constantly engaged in modulation, managing incoming signals from both senses to improve the system. Oscillopsia is what happens when this modulation fails.

***

Shuttering vision unbalances the body, spinning it into a perpetual, rolling list. Unsurprisingly, in attempt to consolidate what is seen and felt, oscillopsia can produce an abnormal gait. The body that charges through the streets of Vice City is perhaps more stable, but its movements are nonetheless inconsistent. In part, this is to do with the conversion of

[3] *Grand Theft Auto V* (2013), Rockstar Games, Microsoft Windows.
[4] Fred Moten: *Stolen Life: (consent not to be a single being)*, Durham 2018, p. 131.
[5] Morris B. Bender: "Oscillopsia", in: *Archives of Neurology* 13 (1965), pp. 204–213.
[6] Michel Serres: *The Five Senses: A Philosophy of Mingled Bodies (I)*, London 2009, p. 56.

analogue finger gestures into discrete, digital commands. Game controllers, though ever improving, necessarily delimit sensitivity. Whether instructed by a gamepad, mouse or keyboard, avatars are compelled to move and reorient in fits and starts.

This lurching logic precedes Tommy Vercetti's particular modus operandi. His Vice City missions unfold in a series of hit-and-runs, rapid exchanges, flying punches, snapping potshots and ducking to evade gunfire. Against this excess of movement, a gameplayer might appear static and stilled in front of the screen. But movement intensifies in the fingertips, as pattering digits are converted to abrupt changes in direction. In GTA, smash-and-grab forms the staccato rhythm that tethers player to avatar.

***

In 2009, a classmate had his gait and gestures motion-captured by Rockstar North for a gay non-player character (NPC) in GTA5. Having adorned the slinky mocap suit, he described strutting and striking poses, amplifying his normally effete movements. Invited to become a caricature of himself, his body was converted to code and reconstituted as one or a number of clichéd characters inside the game. He lives on as a camp, prancing ghost, haunting the streets of a fictional city.

All GTA characters comport themselves to an exaggerated, almost comical degree, which largely informs how they should be read. This was especially important in older game releases, like Vice City, where low resolution and flattened texture limited the expressive possibilities of the face. Women walk with unfeasibly rolling hips; a real estate mogul manspreads impossibly, mobsters are embellished with wild gestures from classic gangster movies. Each is choreographed to perform their own hyperbole.

A century ago, gesturing bodies were captured in the measurement regimes of Charcot, Gilles de la Tourette, Muybridge and Marey. The instruments of measure, not least photography, did not merely record or demarcate normal and aberrant bodies, but actively constituted their deviation. Thus, as Agamben writes, new media brought forth "an amazing proliferation of tics, spasmodic jerks, and mannerisms – a proliferation that cannot be defined in any way other than as a generalized catastrophe of the sphere of gestures".[7] Within a few decades, however, Agamben suggests that those conditions seemed to disappear. They vanish into a population who, infected by the jerky, shocked bodies of early cinema, have all lost control of their gestures.

[7] Giorgio Agamben: *Means without End: Notes on Politics*, Minneapolis 2000, p. 51.

***

If bodies observed by and observant of image media – cinema, photography, video games – are moved or shocked in particular ways, how about those who wield the technical devices? In 1924, George Eastman related his invented word 'Kodak' to the brusque operation of the mechanical camera, describing it as: "Terse, abrupt to the point of rudeness, literally bitten off by firm and unyielding consonants at both ends, it snaps like a camera shutter in your face".[8] Other manufacturers followed suit, generating their own snappy names for cameras – Leica, Acro, Nicca.

These product names, alongside their advertising copy, constitute the first vocabulary of photographic discourse for the consumer-photographer of the twentieth century. Their shortened vowels, sharp consonants and clipped delivery recapitulate the accelerated photographic act. This is not merely onomatopoeic mimicry, but the production of a particular affect that infiltrates a new kind of photographing. Snapshot photography is no smooth technological transition, but a sudden move, shock or stutter. The rapid shutter both called into being and harnessed a particular, traumatic bodily relationship to the camera, to technology and to the modern world.

***

If photographing is shocking, decades of technological innovation have been concerned almost entirely with softening the blow. Improvements in shutter mechanisms and faster lenses, efforts to reduce grain and increase emulsion sensitivity, automation of film loading and winding, the development of image stabilisation in lenses and the algorithmic regime of computational photography: all serve to lighten the demands on a photographing body. Camera manufacturers and fetishists alike yearn for effortless, frictionless, smooth mechanics. This logic is mirrored in game development, too, where rapid and transformative developments in processing power, screen resolution and gesture control have aimed to produce an unhindered, glitch-free performance.

Nevertheless, glitches persist. What's known as 'shutter lag' continues to plague gamers, where a slight mismatch of screen refresh rates, processing capacities, cabling, and the peculiarities of the game environment themselves, produce a visual stuttering effect. Taking its name from the gap between pressing the camera shutter and the opening of the lens, shutter lag is a space of pure incalculability. It forces a limit on the perpetual smoothing and glossing of technologised experience. It points towards – as

[8] Josef Maria Eder: *History of Photography*, New York 1978, p. 489.

Luciana Parisi shows us of the algorithm – a kind of incompleteness. The algorithm is never fully determined: it produces its own internal instability, a fugitive openness that is not "exhausted by the image of the future".[9]

***

When the Venezuelan artist Gabriela Mesones Rojo took up residence in Los Santos, the city constructed for the multiplayer Grand Theft Auto Online, she created a series of videos, images and texts called *Paisaje Ulterior*.[10] Her journey through this world is marked by philosophical doubt and creeping horror. In one video, shot in-game using a first-person perspective, she halts at an intersection where there's been a fatal accident. Bodies scatter the road, blood pools on the asphalt. Cars enter, swerve, crash over the bodies. The street is streaked with bloody tyre tracks. Horns blare and insults are yelled: "Chiquita, what the fuck, bullshit! Get out of my fucking way". Finally, a car revs in front of her, then runs her down. Her final view is a glimpse of a vast, starry sky.

Rojo's refusal to move, to go with the flow, to fight or take flight, to follow the game logic, proves deadly. While her in-game photographs present emptied, eerie moments and interiors, accompanying short texts recall what was endured to make them. These fleeting thoughts recount dangerous encounters and technical hitches, the regret of missed images and killing your friend by accident: the ethical and philosophical quandaries that come with survival in Los Santos. She observes the limitations of the photographic act offered in the game: "Photography in GTA lets you handle focus and framing. It does not allow you to handle light, it does not allow you to crouch, it does not allow you to have a pulse, it does not allow you to capture anything with soul".[11]

If the gameplay of GTA is designed to be smoothing, if its images are sublime, if it offers freedom of movement, Rojo disturbs this glassy surface. Her utterances ricochet hard: "This is not a treatise on the gaze. It's an essay on confinement." She also slips between worlds – "Caracas is not Los Santos. Los Santos is not Caracas" – and refuses to recognise this as 'just' a game. In her videos, Rojo's avatar is invisible but for the periodic inspection of her chewed nails. Over and over, she brings her bruised, bashed and tattooed knuckles into view, a kind of programmatic looping tic. In-game and out-game, we occupy a shocked and broken body.

9 Luciana Parisi: *Contagious Architecture: Computation, Aesthetics, and Space*, London 2013, p. xiii.
10 Gabriela Mesones Rojo: *Paisaje Ulterior*, London 2018.
11 Mesones Rojo: *Paisaje Ulterior*, op. cit.

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There's a running track a few miles from my home, where I go to inline skate on weekends. Although it uses many of the same muscles, skating has an entirely different texture to running. It creates no visual disturbances: skating flows, where running – at least for me – shudders. Skating might even be, as Serres writes of cycling, the rediscovery of an innate roll and pitch, a body that "glides on a thousand ball bearings".[12]

Like photography, like video games, skating is utterly dependent on a conglomeration of technical apparatuses, assembled in global manufacturing chains. Steel frames, polyurethane wheels and alloy bearings are the organs of its own stabilizing system. But skates don't balance on their own, they require an emboldened wearer. An ungainly, uncoordinated body meets heavy, clunky footwear. Homeostasis – balance, stillness, regularity – is always temporary and negotiated, between a body and its milieu, flesh and tool, reflex and program.

***

Oscillopsia is no illusion. It brings to sensation a world that is shocking, shimmering, quivering, all mixed up. In the quantum universe, which is to say, our universe, everything is in motion, part of what Karen Barad calls "the lively dance of mattering".[13] The world stutters, in fits and starts. But when I skate, something stills. I become cyborg. I glide, in oblivious circles.

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[12] Michel Serres: *Variations on the Body*, Minneapolis 2011, p. 118.
[13] Karen Barad: *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning*, Durham 2007, p. 37.

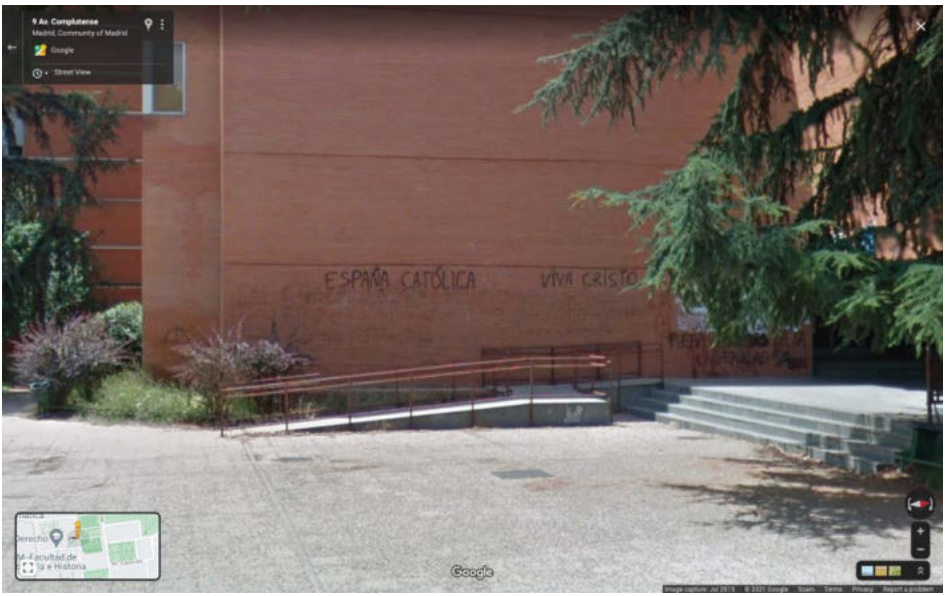
Paisajes Digitales de una Guerra
(tr. Digital landscapes from a war)
2015 – ongoing

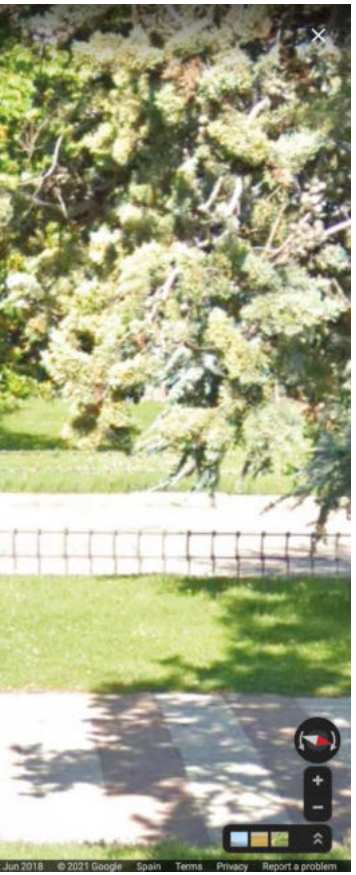
Azahara Cerezo

Paisajes digitales de una guerra (tr. Digital landscapes from a war) collects images of political graffiti found in areas known to have been sites of political unrest during the Spanish Civil War (1936–1939) through the lens of Google Street View. Messages appear on walls and surfaces in a temporary and rushed way: messages are written, crossed out, rewritten, erased, etc. Google captures sceneries in a similar manner, taking photographs in different moments and stitching them together to form panoramas and layers of time. The present selection includes three images found in the University City of Madrid, which was a Republican defensive line during the conflict. The project is an ongoing archive and extends to other settings, such as the port area of Cartagena, from which the Republican Navy made their escape, and the old town of Pamplona (Navarra), which came quickly under the control by the rebel side.




Madrid, Community of Madrid
Google
Street View
UCM. Facultad de Geografía e Historia
Google
Image capture


Av. Complutense
Madrid, Community of Madrid
Google
Street View
ESPAÑA CATÓLICA
VIVA CRISTO
Google


Jun 2018
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Spain
Terms
Privacy
Report a problem


Pl. Ciencias
Madrid, Community of Madrid
Google
Street View
PAN PATRIA JUSTICIA
ARRIBA ESPAÑA
Google

Screenshots and the Memory of Photography

Paul Frosh

Writing in 2005, on the cusp of the smartphone and social media era, George Baker addressed what he called "the expanded field of photography".[1] This phrase summarized the idea that the definitional boundaries of photography were being stretched, perhaps to breaking point, to encompass media and aesthetic practices that were not considered classically photographic. Thinking about these developments at the tail end of early photographic digitization, Baker's main imperative was a heightened and pervasive anxiety over the medium's continued survival: the feeling that photography was undergoing a profound crisis of definition and existence, a crisis expressed and propagated in much writing on the digital at that time by the "death of old media" narrative. Rejecting that narrative of inevitable demise, Baker attempted instead to reconstruct the photography and its potential extensions through reference to the practices of artists (such as Cindy Sherman, Jeff Wall and Nancy Davenport) working from the late 1970s to the early 2000s. His aim was not to assess their impact on other artists or art in general, but to trace "the life and potential transformation of a former medium's expanded field [...] a structural field of new formal and cultural possibilities".[2]

In the nearly two decades since Baker's article, novel photographic forms and practices have extended that structural field in new directions: examples include "live" or moving photographs (currently the default setting on the iPhone camera app), transient photographs that disappear after a brief period on applications such as Snapchat, and of course screenshots. Emerging in the context of everyday smartphone usage and the integration of vernacular photography into social media platforms, they expand the medium's field – by which I mean, at a minimum, those practices and forms still *referred to* or *treated as* photography – far beyond the domain of avant-garde artists and art practices at the core of Baker's exploration.

I hope to build on Baker's focus on the expansion rather than the expiration of photography. Taking the screenshot as a primary object to

1 George Baker: "Photography's Expanded Field", in: *October* 114 (2005), pp. 120–140.
2 Ibid.,p. 131. See also Lucy Soutter: "Expanded Photography: Persistence of the Photographic", in: *PhotoResearcher* 26 (2016), pp. 36–43.

think with about some of the contours and dynamics of photography's contemporary expanded field, I will argue that the very elasticity of photography's identity in the smartphone and social media era is epistemically, existentially and aesthetically productive. It enables the relocation of photography to new digital arenas of human experience, action, and being. Such an expansion needs to be theorized as a consequence of processes of active recollection and reconfiguration: in other words, of cultural memory. Here, however, I will not dwell on the extensively researched insight that photography is an agent of cultural memory; rather, I will emphasize a converse proposition: that *cultural memory is an agent of photography*, that photography's expansion is enabled by our remembrance *of* the medium.

My examination takes as its starting-point a long chapter on screenshots in my last book, *The Poetics of Digital Media* (2018).[3] The chapter analyzed the screenshot in order to exemplify what I call the "poetics" of media, the way media technologies and objects populate and produce worlds of action and experience, and have become a kind of technologized second-nature which we inhabit most if not all of the time. I was particularly interested in how screenshots seemed to be everywhere in our culture, constantly in use, and that despite their ubiquity they had attracted very little attention, either from scholars or in public discourse. They are, I said, the unglamorous workhorses of digital culture: the screenshot is extraordinarily pervasive as a way of quoting from digital media, while largely escaping our notice as a distinctive cultural practice with particular assumptions and effects. It is still true to say that there has been barely a single case of public or scholarly controversy over the veracity of a screenshot, even though screenshots are no harder to manipulate, and no less ideological in construction and implication, than *regular* digital photographs. As Wendy Chun says: "*our media matter most when they seem not to matter at all*."[4] This is precisely the condition of the screenshot.

In what follows, then, I'm going to recap some of the things I wrote in that chapter. But I'm also going to provide a kind of auto-critique of what I wrote, broadening the scope of my original discussion. This broadening is indebted to the research of several others who are rapidly developing a field of research activity around what we could call "cameraless photography" in digital contexts. I'm thinking of work by scholars like

[3] Paul Frosh: *The Poetics of Digital Media*, Cambridge / UK, Medford 2018.
[4] Wendy Hui Kyong Chun: *Updating to Remain the Same: Habitual New Media,* Cambridge / Mass. 2016, p. 2. Italics in original.

Poremba and Giddings on in-game photography, and especially Winfried Gerling's genealogy of the digital screenshot in relation to the images of pre-digital screens, for instance the screens used for displaying x-ray images, or photographs of cathode-ray tube television screens, and in particular his distinction between "screen image photography" – actual photographs of a screen taken by an external camera, and "digital screenshots", created internally by the device on which the image is displayed.[5] More recently, Jan Švelch (2020) has used some of these distinctions to argue for a continuum of "photographic screen capture" – his umbrella term for the phenomenon – between documentary or evidentiary screenshots, and images (typically in-game photography) with a more aesthetic, spectacular and often promotional intent.[6]

The Evidentiary Screenshot

With this work in mind, let's return to the underlying question that I asked about screenshots in my book, and also to the answers I gave. What is a screenshot? One answer is that a screenshot is a digital image of the screen (either whole or part) of a digital device at a particular moment in time, taken by the device itself (this is roughly the definition Gerling gives). Technically, the digital screenshot is created by extracting the information from a computer or mobile device's frame buffer, a section of memory which stores the visual information displayed on the screen at a given moment, along with instructions to the device to interpret this information as an image file format like JPEG.

Communicatively, however, the screenshot is much more than this technical description suggests. It is a kind of digital document and a remediated photograph.

Figure 1 shows a banal example: a section from an article in Ha'aretz, a daily Israeli newspaper and website, about Trump disputing the outcome of the 2020 US Presidential Elections, which displays one of his tweets via a screenshot. The example is banal not just because, before his 2021 Twitter ban, Trump tweeted almost all the time, but also because much

[5] Cindy Poremba: "Point and shoot: Remediating photography in gamespace", in: *Games and Culture* 2/1 (2007), pp. 49–58; Seth Giddings: "Drawing without light: simulated photography in videogames", in: Martin Lister (ed.): *The Photographic Image in Digital Culture*, Abingdon 2013, pp. 41–55; Winfried Gerling: "Photography in the Digital: Screenshot and In-Game Photography", in: *Photographies* 11/2–3 (2018), pp. 149– 167.

[6] Jan Švelch: "Redefining Screenshots: Toward Critical Literacy of Screen Capture Practices", in: *Convergence* 27/2 (2021).


עם הפסדו של טראמפ בג'ורג'יה הצטמצמו עוד יותר האפשרויות שלו להטות את התוצאה הסופית לטובתו. בפנסילבניה, שבה ביידן קיבל 82 אלף קולות יותר מטראמפ, הקמפיין של הנשיא ביקש משופט להכריז עליו כמנצח במדינה. בוויסקונסין, שילם עבור ספירה חוזרת של חלק מהקולות, אך שסקירים בוועדות הבחירות במדינה אמרו שדווקא ביידן צפוי לקבל יותר קולות בספירה החוזרת ולהגדיל את יתרונו שעומד על כ-20 אלף קולות. במישיגן, קמפיין טראמפ הגיש תביעות משפטיות בכמה מדינות, בהן מישיגן, אבל לפי שעה לא נראה שהוא רושם הצלחה בהן, בין היתר משום שחלקן לא מתבססות על ראיות מוצקות להונאה בבחירות כפי שטוענים הנשיא ומקורביו.

Donald J. Trump
@realDonaldTrump

Thousands of uncounted votes discovered in Georgia counties. When the much more important signature match takes place, the State will flip Republican, and very quickly. Get it done! @BrianKempGA

3:46 אחה"צ · 19 בנוב' 2020

233.1K אנשים מדברים על זה 70.3K

Fig. 1: Screenshot of a tweet by Donald Trump, Ha'aretz November 20, 2020.

reporting of his tweets in the mainstream media included screenshots of them, even when the articles also quoted the written contents of the tweets verbatim. So here the screenshot provides seeming *evidence* of the tweet, brought before the eyes of the reader. It reproduces what Lisa Gitelman calls the "know-show" function of documents in Western societies, particularly their centrality to the epistemic regimes of journalism, scientific discourse, and bureaucratic organizations, among others.[7]

This example does not, however, do justice to the relationship between the evidentiary screenshot and the temporality of digital interactions, and their manifestation on digital screens. A better-known example, which I give in the book, reveals this relationship to be based on the contingent, impermanent and event-like structure of such interactions (see Figure 2).

This tweet – which became known as the "covfefe" tweet – appeared in President Donald Trump's Twitter feed just after midnight on May 31, 2017; what is important from our point of view is that it was *deleted* just before 6am on the same day. Since Trump had at that time around 31 million Twitter followers, many will have seen the tweet natively on the Twitter app. Many more, however, will have encountered it through media outlets beyond twitter, where it was widely reported, discussed and derided. As with the example above, these outlets did not simply report on Trump's tweet: they almost invariably used screenshots to reproduce the tweet itself. And these screenshots, like the one shown here, did not just display the text of the "covfefe" tweet: Trump's words were included along with a plethora of *incidental* referential details, the

7 Lisa Gitelman: *Paper Knowledge. Toward a Media History of Documents*, Durham 2014.



Fig. 2: Donald Trump's "covfefe" tweet May 31, 2017

additional signs and information that appear on the twitter interface itself, such as the name of Trump, his photo, the time and date of the tweet, the number of retweets and likes at the time the screenshot was created. The screenshot, at least in this case, signalled its own temporal contingency within an ongoing digital world in continual flux, while at the same establishing itself as a permanent record of a part of that world.

Notwithstanding the emphasis on the interminable mobility, flux and performativity of digital culture among several scholars, notably Lev Manovich writing about software culture, and Hoelzl and Marie in their theorization of the digital "softimage", what the "covfefe" image shows us is not merely the importance of the screenshot as evidence, but as a material form providing *communicative fixity*. For the screenshot is precisely an "enduring ephemeral", another phrase from Wendy Chun.[8] While it is the perpetual product of real-time computational performances,[9] its communicative value is premised on its relative immutability over time and across digital contexts. Like the printout, the screenshot brings fixity and regularity to the incessant stream of digital performances, including for applications like Snapchat and features such as Instagram stories which deliberately seek to defy communicative permanence. Hence the screenshot of the "covfefe" tweet is not redundant since it acts as evidence that the "covfefe" tweet *had in fact existed* even after it had been deleted, something that a mere quotation of the words is unable to show. It attests to the status of such interactions not merely as the rhetorical effects of textual residues, but as occurrences in their own right: the screenshot

8 Lev Manovich: *Software Takes Command*, New York 2013; Ingrid Hoelzl and Remi Marie: *Softimage: Towards a New Theory of the Digital Image*, Bristol 2015; Wendy Hui Kyong Chun: "The Enduring Ephemeral, or the Future Is a Memory", in: *Critical Inquiry* 35/1 (2008), pp. 148–171.

9 Manovich: *Software Takes Command*, op. cit.

helps to imbue textual-digital sequences, and the reference worlds they address and evoke, with an *event-structure*. It is thereby anchored in, and anchors in turn, a fundamental ontological premise regarding the stable, continued and verifiable existence of Twitter in particular, and digital interactions in general.

Before we conclude that this evidentiary and event-structuring function of the screenshot is restricted to journalism, or even more narrowly, to news reports of Trump, let me turn your attention to an article by Victoria Jaynes on the everyday, minute-by-minute, use of screenshots among teenagers.[10] Central to her findings is the widespread (but also gendered, and normatively regulated) use of screenshots as evidence not only of the occurrence of particular online interactions and conversations, but also of their precise details. The evidentiary screenshot is therefore a key player in a truly historic transformation in the fundamental conditions of social life: ordinary interactions and conversations – which for most of human history were undocumented – are increasingly shaped by the surveillant and archival logics (visibility, recording, searchability, replicability) that infrastructures such as social media, and cultural forms such as the screenshot, make routinely possible.

The Spectacular Screenshot

It would be a mistake, however, to claim that the screenshot is entirely evidentiary in use. Figures 3–5 are from Leonardo Sang's *Virtual Reality Photography* (*VRP*) project, which "uses video games as platforms for everyday photography [...]. All the pictures created are composed just like 'real-world' photography".[11] The particular images selected were created from versions of the computer games Bad Company and Battlefield V.[12] Examples of in-game photography, they fit Gerling's definition of "digital screenshots" since they were created internally by the device on which the image was displayed. To my mind they are beautiful images of visually rich and intricate digital worlds.

We could, of course, claim that these are documents of those game-worlds, designed to provide evidence of their on-screen existence at a particular point in time, but I think that would be stretching the cate-

[10] Victoria Jaynes: "The Social Life of Screenshots: The Power of Visibility in Teen Friendship Groups", in: *New Media & Society* 22/8 (2019), pp. 1378–1393.

[11] Leonardo Sang, *VRP*, 2011–2020, https://leosang.com/vrp (last seen: December 6, 2021).

[12] *Battlefield: Bad Company 2* (2010), Electronic Arts, Xbox 360; *Battlefield V* (2018), Electronic Arts, Microsoft Windows.



Fig. 3: Leonardo Sang: *from Bad Company 2 to Battlefield V*, 2011.



Fig. 4: Leonardo Sang: *from Bad Company 2 to Battlefield V*, 2011.



Fig. 5: Leonardo Sang: *from Bad Company 2 to Battlefield V*, 2011.

gory too far. They seem to conform to what Švelch calls "transformative screenshot practices": they are generally created for promotional or artistic purposes, and they are often (though not of necessity) transformative in that *post-production* manipulation techniques may have been used to create particular effects in ways that would undercut the evidentiary transparency claimed by the earlier screenshots I discussed.[13] Instead, these kinds of images are digital *spectacles*: they are created to emphasize their own aesthetic character as images, and the visual dimensions of their referent worlds as picturable phenomena. The indexical and iconic relationship to what they depict, while not irrelevant entirely, is secondary to this spectacular purpose.

Interestingly, this revision does not undermine – though it does alter – my second claim about screenshots: that the screenshot is a *remediated photograph*. Technically, of course, the screenshot is not a photograph at all: it is not produced by light rays making contact with a photosensitive surface, whether a chemical emulsion or electrical sensor. Nevertheless, the screenshot is a powerful remediation of the photographic image,[14] in that it cites and mobilizes conventions of production and viewing that invite it to be treated as a photograph. Most obvious here is the name itself – screenshot – which alludes of course to the photographic snapshot. No less important, however, is that on taking a screenshot my smartphone or computer make the sound of a shutter mechanism, just as they do (as a default setting) when I take a conventional digital photograph using a smartphone, even though in neither case is a mechanical shutter involved. This equivalence between photographs and screenshots is further reinforced by the fact that my screenshots are stored by my phone in the same application along with all my other "photos".

Obviously, these remediation effects apply to everyday evidentiary screenshots. So how do spectacular screenshots like Leonardo Sang's images also qualify as remediated photographs? In at least two interconnected ways: first, through the technologies and modes of action required in order to produce them, and second, through the author-functions and cultural fields associated with them.

To begin with: the production of spectacular screenshots often requires specially designed in-game photo software, such as NVIDIA Ansel.

[13] Švelch: "Redefining Screenshots: Toward Critical Literacy of Screen Capture Practices", in: *Convergence* 27/2, op. cit.

[14] Jay David Bolter and Richard Grusin: *Remediation: Understanding New Media*, Cambridge / Mass. 1999.

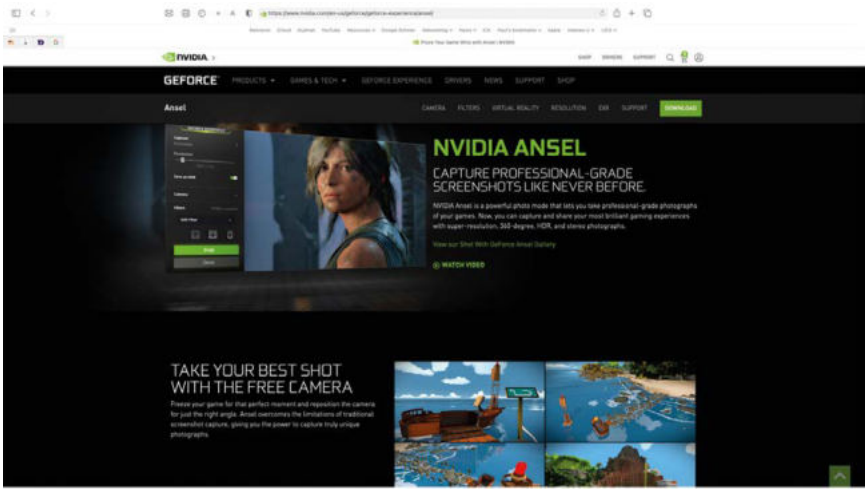


Fig. 6: "Prove Your Game Wins with Ansel NVIDIA" https://www.nvidia.com/en-us/geforce/geforce-experience/ansel/.

NVIDIA Ansel is a programme that allows one to photograph within game worlds, but that is not native to the particular game software itself (some games, as we shall see below, incorporate their own camera interface).[15] Not only does the product name *Ansel* – presumably in homage to Ansel Adams – reference photography history, but the terminology used throughout both the publicity and the software itself continually refers to the medium. The title of the web page (shown in Figure 6 – how else? – via a screenshot) clearly invokes photography as an evidentiary and event-structuring ancestor medium: "*Prove* Your Game Wins with Ansel NVIDIA" (my emphasis). Whole paragraphs draw direct connections between the screenshots created by Ansel and real-world camera-based photography:

> Freeze your game for that perfect moment and reposition the camera for just the right angle. Ansel overcomes the limitations of traditional screenshot capture, giving you the power to capture truly unique photographs. (See Figure 6).

What is important to understand here is that remediation is not simply achieved through the discursive evocation of photography in publicity material like the website, but is built into the interface and simulative functionality of the software itself. The software works by requiring its users to act *as if* they are taking photographs of a pre-existing world, usually

[15] Editors' note: See Cindy Poremba's examination of NVIDIA Ansel in this volume.

characterized by spatial relations and natural material properties – most crucially light – familiar from physical existence: it is this seemingly pre-existing virtual world that users view on their screens, and which they "capture" via a "camera" whose parameters they operate, also on their screens. The software's simulation of photography uses the medium to evoke and secure the virtual game-world's chronological and existential priority with respect to the image that the device "takes" of it. Lest the fact that the device *pictures itself* via a screenshot cause confusion regarding the ontological status of that which is depicted, photography is put into play as a culturally legible form, anchored in collective memory, for creating images that are necessarily *of* an independently existing prior reality. Only an independently pre-existing world (a world of light and light-sensitive surfaces) can be thought picturable in precisely *photographic* ways.

The screenshot's remediation of photography thus helps to elide an important technical circumstance: that the *photographing* device also produces the world-on-the-screen – which we can call the *screenscape*[16] – as a real-time computational performance *at the very time of its capture*. This bestows upon the game world, and images of it, different orders of being, even though both are computational products of the same screen-based system: scenes of the virtual world are made distinctive from and anterior to the device's images of them, by virtue of the fact that the latter are "photographs".

The second way that these spectacular images are remediated photographs is through the repeated claim that they are created by people who identify themselves as photographers. People like Leonardo Sang, who have moved, with their training, experience and compositional and aesthetic competencies, and their publicly declared and privately felt artistic and professional identities, across the increasingly porous boundary between the physical and the virtual. As Sang's website describes him:

> Leonardo Sang (1990) is a self-taught photographer living and working in São Paulo, Brazil.
> In 2009, he bought a Nikon film camera from a friend. Since then, he has been practising his photographic skills whenever he can, from slacking off work, to family trips, from real world assignments to virtual reality photography.[17]

To take another example, this time of a photography interface that (unlike NVIDIA Ansel) is built into a particular game. Pete Rowbottom, a British landscape photographer (and winner of the UK Landscape Photographer

[16] Frosh: *The Poetics of Digital Media*, op. cit.
[17] Leonardo Sang: "About", https://leosang.com/about.

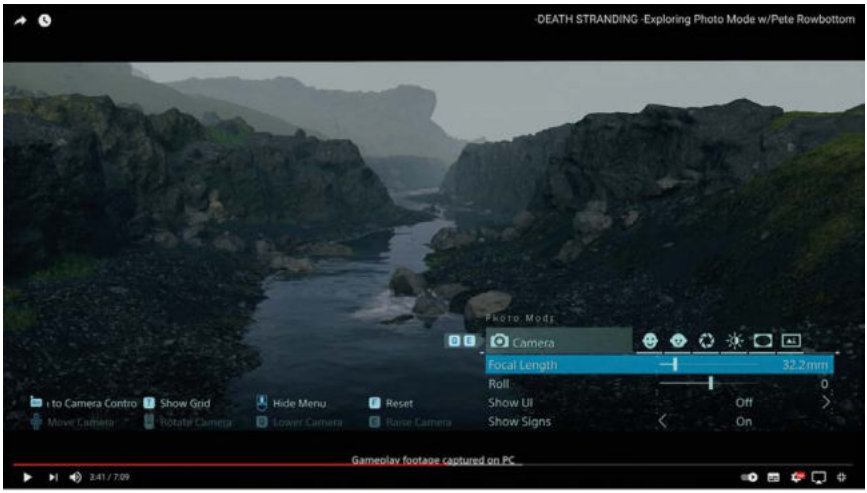


Fig. 7: Screenshot from Kojima Productions' *Death Stranding: Exploring Photo Mode w / Pete Rowbottom*.

of the Year Award 2018), provides the narrative and commentary for a Kojima Productions video about the photo mode of their game Death Stranding. In the video, scenes of Rowbottom walking through and photographing country landscapes are interspersed with scenes of the virtual terrain of the computer game, including of a game character wandering through it. Additional scenes show Rowbottom[18] using the photo-mode interface, pictured in Figure 7, to compose and take an image of rocks in a stream in a virtual landscape.

Near the beginning of the video, Rowbottom notes:

> You can explore some absolutely breath-taking landscapes. You can stop wherever you like and basically take photos. It is almost real. And for me it is something I could actually use to teach people ideas about framing, composition, lighting. You're able to do everything, you're able to move around, you're able to create composition, just like you would do if you were outside." (1:17–1:45).[19]

Two intertwined themes emerge here. First is that photo mode enables the transferability of photographic skills and experience across the physical-virtual divide. The photo mode interface encourages and rewards the importation of expertise into the virtual system. In this sense, photo mode is

[18] Kojima Productions: *Death Stranding – Exploring Photo Mode w / Pete Rowbottom*, August 19, 2020, 1:17–1:45. https://www.youtube.com/watch?v=M4lyGolq8nM (last seen: December 6, 2021).

[19] Kojima Productions: *Death Stranding – Exploring Photo Mode w / Pete Rowbottom*, op. cit.

a less sophisticated version of certain computer visualization and design software, such as Maxwell Render, whose photographic interfaces include detailed simulations of camera settings, camera models and brands, lighting fixtures, etc. Yet this transfer of photographic expertise does not only move in one direction, from the physical world into the game. Rather, and resonating with the history of simulation technologies in other spheres (such as aviation), photo mode is imagined by Rowbottom as a potential training ground for the acquisition of knowledge and refinement of skills (framing, composition, lighting) which can then be applied to real-world contexts.

The second theme is the profoundly embodied character of this movement across physical and virtual spaces, emphasized in the video via cross-editing of Rowbottom wandering through the UK countryside and the game character walking across the game terrain. "You can stop wherever you like…you're able to move around". The physicality of virtual landscape photography is emphasized again later in the video when, accompanying images of the game character striding across rocky meadows and climbing hills, Rowbottom says:

> As a landscape photographer, you often find yourself doing a lot of walking through the landscapes to find something that you want to shoot. Don't be tempted to just try and take pictures of the first thing you see. You're going to get the best shots if you walk and do a lot of exploring and traveling within the game and find some amazing scenes to take pictures of. (4:01–4:19).[20]

What Rowbottom is describing, then, is not the mere application or transfer of expertise, but an entire professional-personal orientation towards a world approached, at a bodily level, as amenable to physical exploration and as eminently *photographable*.[21] The physicality of this orientation attests to the involvement of a professional habitus – a socialized set of dispositions, attitudes, habits, skills and practices – that includes, crucially, distinctive modes of bodily comportment and action, of *hexis*: "a pattern of postures that is both individual and systematic, because linked to a whole system of techniques involving the body and tools, and charged with a host of social meanings and values".[22] This is, of course, particularly important since the photographer's body has long been understood as a central part of the photographic apparatus.[23]

[20] Kojima Productions: *Death Stranding – Exploring Photo Mode w / Pete Rowbottom*, op. cit.
[21] Editors' note: See Rowan Lear's examination of the body in the photographic process in this volume.
[22] Bourdieu, Pierre: *Outline of a Theory of Practice*, Cambridge / UK 1997, p. 87.
[23] Vilém Flusser: *Towards a Philosophy of Photography*, London 2000; Doron Altaratz and Paul Frosh: "Sentient Photography: Image-Production and the Smartphone Camera", in: *Photographies* 14/2 (2021), pp. 243–264.

The status of the spectacular screenshot as a photograph, and of the virtual space as photographable, is thus also produced by the fact that photographers seem able to inhabit this space *physically*.

The significance of the photographer's status, expertise and habitus to the remediation of spectacular screenshots in these examples is starkly different to most of the evidentiary screenshots discussed earlier (such as Trump's tweets). Who in fact photographed such evidentiary images is almost irrelevant – or at the very least far less important. Evidentiary screenshots thus draw upon what Don Slater calls the photograph's "mechanical realism",[24] which foregrounds the production of images through a mechanized, highly automated and seemingly impersonal process. Spectacular screenshots, in contrast, draw upon their "representational realism" – their (superior) fulfillment of conventions and standards of realism – bulwarked by powerful rhetorical markers of aesthetic significance, particularly authorial expertise, authority, experience and style.

From Remediation to Relocation

This broad distinction between evidentiary and spectacular screenshots is, as I have noted, an elaboration of categories proposed by Gerling and Švelch.[25] My account differs mainly in emphasizing how these categories are constructed and maintained through the remediation of photography. The documentary screenshot, though not an indexical image, remediates and thereby reaffirms the evidentiary power that has long been ascribed to the photograph. As noted, this is connected to the know-show function of documents more generally. As in the case of documents, the evidentiary power of photography is a techno-cultural, ideological and institutional construct, something that generations of thinkers and researchers on the topic have repeatedly averred. The converse of this is that since photographic evidentiary power is constructed rather than technologically inherent, it can also be transferred to technologies and images which do not precisely share photography's technical or semiotic character, but are – like the screenshot – repeatedly treated as kinds of photographs.

This is also true for the spectacular screenshots. Except that what is remediated is less the evidentiary power of photography, but its *spectacular*

[24] Don Slater: "Photography and Modern Vision: The Spectacle of 'Natural Magic'", in: Chris Jenks (ed.): *Visual Culture*, London 1995, pp. 218–237.

[25] Gerling: "Photography in the Digital: Screenshot and In-Game Photography", in: *Photographies* 11/2–3 op. cit.; Švelch: "Redefining Screenshots: Toward Critical Literacy of Screen Capture Practices", in: *Convergence* 27/2, op. cit.

power.[26] I mean by this that photography constructs the world as always already picturable, as a world-picture in Heidegger's famous phrase, where its objects are pre-defined as things to be viewed and composed before an external gaze (which is thereby granted a certain power over the seen / scene). Similarly, the spectacular screenshots remediate photography to construct and reaffirm the pictoriality of the worlds they capture and embellish, just as they foreground the (photographically inflected) aesthetic skills and pleasures, techniques and technologies that are used in their own creation as images.

In these examples a lot of conceptual force is being applied to the term "remediation". Bolter and Grusin define the term roughly to refer to how media cite, mimic, and refashion other media primarily according to two logics – transparent immediacy, where the medium becomes invisible as a conduit for the content it presents, and hyper-mediacy, where the presence and activity of the medium itself are foregrounded.[27] We could argue that the documentary screenshot remediates photography transparently, whereas the spectacular screenshot does so hypermediatly, though it's not certain that the distinction holds completely across both these forms. For Bolter and Grusin, remediation is not restricted to the digital era but is a recurrent and permanent phenomenon of media (and mediation) as such. Significantly, Manovich argues against this position in his discussion of the computer as a "metamedium" that remediates by simulating existing media (obviously including photography).[28] Giving an account of the work of Alan Kay and his Xerox Parc team in the 1970s, Manovich adds a significant historical dimension, effectively arguing that it was *not* inevitable that the computer should have evolved from a calculating and information-processing technology into a machine for producing remediations. Remediation is neither inexorable nor universally applied: it emerges under particular conditions and constraints, in the specific historical development of technologies as they interact with their cultural milieux. Extrapolating from this argument to the case of the screenshot, one can say that it was not inevitable that images created by devices of their own screens should reproduce the epistemic, aesthetic and ontological relations associated with photography. Remediation, in the instance of the screenshot as in other cases, requires *work*.

[26] Paul Frosh: "The Public Eye and the Citizen Voyeur: Photography as a Performance of Power", in: *Social Semiotics* 11/1 (2001), pp. 43–59.
[27] Bolter and Grusin: *Remediation: Understanding New Media*, op. cit.
[28] Manovich: *Software Takes Command*, op. cit.

What kind of work does remediation involve? Francesco Casetti's notion of media "relocation" gives us a good theoretical starting point.[29] Focusing on cinema, Casetti argues that a medium can be relocated to new spheres (and new configurations) as a cultural experience, autonomously of the technical apparatus (projection, darkened theatre) with which it was previously associated: hence one can experience "cinema" on the screen of an iPhone. Relocation is possible in part through remediation, but more significantly because cinema is a cultural experience which has become historically sedimented: that is, it is recognizable as a distinctive mode of representing and relating to the world. The habits formed by going to the cinema, embodied and social modes of spectatorship, generational memory of cinema,[30] and the "social image" of cinema circulating in public and specialist discourses: all contribute to "practices of recognition" that sustain an "idea of cinema".[31] It is this idea of cinema which – tentatively, since Casetti describes relocation as an imperfect and uncertain process – enables the medium not only to persist but to expand into new contexts. The relocated medium is thus reaffirmed as it is also relocated and extended into new arenas.

Relocating this hypothesis, so to speak, from cinema to photography, the screenshot can be understood not simply as a remediation but also as relocation of photography as a medium that persists notwithstanding the radical changes to its core technologies in recent decades. The work being done in this process is *memory-work*: not the mere retrieval from storage of past instantiations of the medium, but – following from literatures on individual and collective memory[32] – a "reconstructive process"[33] that reconfigures prior attributes for *present* purposes and contexts. The screenshot is thus (among other things) a product of, and a vehicle for, the *cultural memory* of photography: broadly speaking, photography survives radical change by being systematically remembered and reproduced, discursively and materially, in accordance with contemporary conditions. This view of course alters the conventional relations between photography and memory, shifting emphasis away from photographic images as vehicles of individual and shared remembering, and instead giving priority

29 Francesco Casetti: "The Relocation of Cinema", in: *NECSUS* 1/2 (2012), pp. 5–34; Francesco Casetti: *The Lumiere Galaxy: 7 Key Words for the Cinema to Come*, New York 2015.

30 Casetti: *The Lumiere Galaxy: 7 Key Words for the Cinema to Come*, op. cit., p. 19.

31 Casetti: *The Lumiere Galaxy: 7 Key Words for the Cinema to Come*, op. cit.

32 Maurice Halbwachs: *The collective memory*, New York 1992, p. 52; Paul Ricoeur: *Memory, History, Forgetting*, Chicago 2004.

33 Aleida Assmann: *Cultural Memory and Western Civilization: Functions, Media, Archives*, Cambridge / UK 2011, p. 19.

to cultural memory as the framework through which photography itself persists, flourishes and is relocated into an "expanded field".

What is more, the ramifications of these memory processes are not merely technical. They draw upon and reanimate structured constellations of epistemic and aesthetic schemas, worldviews, social values and behavioural scripts historically associated with photography. Hence the cultural memory of photography perpetuates and reanimates previously constituted protocols for representing and relating to the world, enabling their relocation and expansion to radically new contexts of everyday digital life.

I have already mentioned two such cultural memory constellations which are elicited by the screenshot: photography's *evidentiary* power to produce visible evidence of the world and instantiate epistemic ties between visibility and truth,[34] now applied through the screenshot to both everyday and more socially momentous digital encounters and events; and photography's *spectacular* power to cast the world as picturable, pre-defining its objects as things to be seen and composed before an external gaze,[35] now expanded to grant digital worlds ontological plenitude and aesthetic legitimacy. One can certainly postulate other constellations for possible mnemonic uptake, such as an *expressive* energy which expands the repertoire and accessibility of aesthetic techniques and pictorial forms among different populations,[36] and an *ethico-political* modality whereby photography enables or forces challenging encounters with others.[37] These memory constellations, historically sedimented in various ways (primarily in Western modernity), may be activated and enabled to "travel"[38] within and across contemporary spheres of interaction and experience shaped by the increasing ubiquity of digital media in contemporary life.

This brings me to my final point. Why should the screenshot's relocation of the memory of photography to digital contexts be socially and culturally valuable? What purposes might the persistence and expansion

[34] Jennifer L. Mnookin: "The Image of Truth: Photographic Evidence and the Power of Analogy", *Yale Journal of Law and the Humanities* 10/1 (1998), pp. 1–74; Dona Schwartz: "Objective representation: photographs as facts", in: Bonnie Brennen and Hanno Hardt (ed.): *Picturing the past: Media, History, and Photography,* Urbana 1999, pp. 157–181.

[35] Slater: "Photography and Modern Vision: The Spectacle of 'Natural Magic'", in: Chris Jenks (ed.): *Visual Culture*, op. cit.; Janne Seppänen and Juha Herkman: "Aporetic Apparatus: Epistemological Transformations of the Camera", in: *Nordicom Review* 37/1 (2016) pp. 1–13.

[36] Marvin Heiferman: *Photography Changes Everything*, New York, Washington 2012.

[37] Ariella Azoulay: *The Civil Contract of Photography*, New York 2008.

[38] Astrid Erll: "Travelling memory", in: *Parallax* 17/4 (2011), pp. 4–18.

of photographic forms and relations through the screenshot perform within contemporary social and cultural landscapes? Thanks to the proliferation of interactive mobile digital communication devices and their infrastructures, media penetrate our everyday lives, saturate our physical and symbolic environments, and occupy our fantasies and dreams. For most people in the Global North, and many beyond it, media have become so profoundly and intensely interwoven with the social world at all scales – from the intimate lives of individuals to global communication infrastructures – that they constitute a ubiquitous techno-cultural second nature.[39] As media such as photography become pervasive in this process of "deep mediatization" they become paramount means for recollecting and giving meaning to that experience,[40] structuring how we remember in part through their salience as *what* we remember. They also become bridgeheads for the organization and communication of new experiences in the deeply mediatized formats of digital social and cultural life, notably – in the present conjuncture – smartphone applications, social media, the web, and digitally constructed virtual realities. Photography, says Kaja Silverman, is "the world's primary way of revealing itself to us – of demonstrating that it exists, and that it will forever exceed us".[41] The screenshot expands those modes of revelation, demonstration, and even excess to the humanly constructed technologized worlds through which we live, ever more extensively, *in* media themselves.[42]

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[39] Mike Featherstone: "Ubiquitous Media: An Introduction", in: *Theory, Culture & Society* 26/2–3 (2009), pp. 1–22; Frosh: *The Poetics of Digital Media*, op. cit.

[40] Nick Couldry and Andreas Hepp: *The Mediated Construction of Reality*, Cambridge / UK 2017.

[41] Kaja Silverman: *The Miracle of Analogy: Or, The History of Photography Part 1*, Stanford 2015, pp. 10–11.

[42] Mark Deuze: "Media Life", in: *Media, Culture & Society*, 33/1 (2011), pp. 137–148.

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Upscaling to Remain the Same

COLL.EO

In 2016, COLL.EO captured more than one hundred of the most boring images they could find from Playground Games' *Forza Horizon* 2 (2014), a free roaming racing game in a sanitized reimagining of the Belpaese, devoid of traffic, reckless drivers, air pollution and pervasive litter. One of the most tedious outcomes of this frankly irrelevant project was an illustrated book entitled *Boring Postcards from Italy*, an in-your-face replay of Martins Parr's seminal *Boring Postcards* (1999).[1] This lazy exercise in appropriation was masqueraded as a commentary on virtual environments, tourism, photography and representation.

Five years later, facing a crisis of identity amidst a pandemic, a war, and supply chain disruptions, COLL.EO proudly presents an updated version otherwise known as (*Still) Boring Postcards from Italy*. Basically, this latest scam uses artificial intelligence to significantly improve the graphics of the original screenshots. Known as *AI upscaling*, the process consists in feeding a hungry generative adversarial network (GAN) a huge data set featuring both low-res and high-res images. Slowly but surely, the algorithm learns what a high resolution image looks like when it sees a low resolution image. Eventually, it creates a new image featuring many more pixels, thus creating the illusion of a higher fidelity to a "real" that never existed in the first place. As a technique, upscaling has been around for quite some time, but with the rise of artificial intelligence, the outcome, both in quantity and quality – not to mention *speed* – has increased dramatically. Like other kinds of photo manipulation, upscaling creates alternative facts and virtual realities, e.g., environments that have never been programmed by the designers or experienced by the players. And yet, these "postcards" unequivocally reclaim their existence and demand our attention. More than anything, they allude to the fact the networked image has become an unreliable narrator of our own memories and possibly something else, although *what* exactly, we are not sure. Did video game environments always look better in our dreams? In his book *New Dark Age* (2018), British artist James Bridle shared a fascinating anecdote:

[1] We're still awaiting a cease-and-desist letter from Mr. Parr's lawyers.

> Robert Elliott Smith, an artificial intelligence researcher at University College London, returned from a family holiday in France in 2014 with a phone full of photos. He uploaded a number of them to Google+, to share them with his wife, but while browsing through them he noticed an anomaly. In one image, he saw himself and his wife at a table in a restaurant, both smiling at the camera. But this photograph had never been taken. At lunch one day, his father had held the button down on his iPhone a little long, resulting in a burst of images of the same scene. Smith uploaded two of them, to see which his wife preferred. In one, he was smiling, but his wife was not; in the other, his wife was smiling, but he was not. From these two images, taken seconds apart, Google's photo-sorting algorithms had conjured a third: a composite in which both subjects were smiling their 'best'. The algorithm was part of a package called AutoAwesome (since renamed, simply, 'Assistant'), which performed a range of tweaks on uploaded images to make them more 'awesome' – applying nostalgic filters, turning them into charming animations, and so forth. But in this case, the result was a photograph of a moment that had never happened: a false memory, a rewriting of history. (…) This is the lesson that we might draw from the dreams of machines: not that they are rewriting history, but that history is not something that can be reliably narrativised; and thus, neither can the future. The photographs mapped from the vectors of artificial intelligence constitute not a record but an ongoing reimagining, an ever-shifting set of possibilities of what might have been and what is to come. This cloud of possibility, forever contingent and nebulous, is a better model of reality than any material assertion. This cloud is what is revealed by the technology.[2]

One thing is certain: even in upscaled form – the poor image has suddenly become rich – these postcards are postcards are *still* reassuringly boring.

[2] James Bridle: *Dark New Age: Technology and the End of the Future*, London, New York 2018, here pp. 151-153.

























Screen Cuts: Training Perception Beyond "the Eye"

Joanna Zylinska

This article takes the form of a proof-of-concept arising from my earlier theoretical work on photography and vision. It starts from a proposition that we need to rethink, via media practice, both the way we see the world and the way we understand *seeing*. Specifically, I propose that the photographic practice of screenshotting, i. e. *cutting* into the media flow of a videogame by a player to collect mementos from the game, can be seen as an exercise in foregrounding human perception, in making it seen *and* felt. I am taking up here Jonathan Crary's understanding of perception as "primarily a way of indicating a subject definable in terms of more than the single-sense modality of sight, in terms also of hearing and touch and, most importantly, of irreducibly *mixed* modalities".[1] Shifting the human perceptive apparatus beyond its conceptual lodging in the eye, screenshotting as enacted in 3D game environments allows players to become more attentive to the distributed nature of perception and vision, a process in which the whole of the human body is mobilized to produce images and thus to enable players to see the world. Screenshotting can therefore be seen as a way of retraining players' eyes, bodies and minds in both seeing the world and understanding perception better. This experience generates new forms of sensation and cognition for experienced gamers as well as game novices. It can also offer valuable lessons for future developments in modelling human vision in machines. By proposing this exercise in corporeal mediated perception I am not advocating a return to perceptualism, a belief in a supposedly timeless experience of a direct communion between the viewer and the perceived object, revealing this object's *truth*. Indeed, I acknowledge that perception, within *and without* games, is not acultural – and that it does matter which game is being played, who plays it, when and what for, as the Coda and the images enclosed in this piece testify.

There is a long history of gamers taking screenshot images of their achievements and memorializing interesting-looking locations discovered on their game quests. Recognizing in those voluntarily shared

[1] Jonathan Crary: *Suspensions of Perception: Attention, Spectacle, and Modern Culture*, Cambridge / Mass. 1999, p. 3.

digital mementoes an opportunity for free and *authentic* marketing campaigns, conducted by *real players* committing so much of their time to playbouring in virtual environments, game companies identified a PR opportunity.[2] Developers then cashed in on the ongoing practice by introducing a dedicated camera mode to their games – from a simple camera device held by a character, such as a reporter in Beyond Good and Evil,[3] through to a sophisticated camera function transforming the whole screen into a camera while mimicking the exposure and processing of a real-life optical device, as in The Last of Us,[4] or even an option for augmented-reality capture, e. g. in Pokémon Go.[5] The technical affordance, coupled with gamers' desire to shape, save and share, led to the emergence of a new para-photographic genre known as in-game photography, aka *screenshotting*. It needs to be highlighted that I am using the concept of in-game photography in this article as encompassing both the activity of screenshotting images by the player *and* the activity of the player's character taking *photos* inside a game with a camera designed as a virtual object within the game. We could even argue that the latter activity is just a literalisation (and marketisation) of the former. This expanded definition recognizes the multiple processes of mediation involved in both sets of activities, their shared photographic legacy at the level of design and functionality – and, most importantly for my argument here, the similar mechanisms of corporeal perception on the *other* side of the screen activated in both.[6] As Matteo Bittanti, who also uses the two terms interchangeably, explains, "'Screenshot-

2 For the term playbour see Julian Kücklich: "Precarious Playbour: Modders and the Digital Games Industry", in: *The Fibreculture Journal* 5, 2005, http://five.fibreculturejournal.org/fcj-025-precarious-playbour-modders-and-the-digital-games-industry/ (last seen: December 20, 2021).

3 *Beyond Good and Evil* (2003), Ubisoft, Microsoft Windows.

4 *The Last of Us* (2013), Sony Computer Entertainment, PlayStation 3.

5 *Pokémon Go* (2016), Niantic, iOS, Android.

6 With this, my argument differs from the one outlined by Winfried Gerling, for whom "[the] practices of the screenshot and photography in computer games must be differentiated by use and function. If the screenshot is more the spontaneous capture or documentation of a temporary status of the computer for various goals such as retaining the settings in a program, a glitch (disturbance), or a constellation on a website, then photography in the computer is more a photographic activity. Its goal is to retain a specific theme: a situation or a scene", in "Photography in the Digital", in: *Photographies* 11/2–3 (2018): pp. 149–167, here p. 157. Gerling's article is fascinating in its tracing of the legacy of the game screenshot back to earlier screen capture techniques in medical and technical photography, with the author's rigorous historical approach justifying the retention of such a strict caesura between setting-capture and image-capture. But the shared kinaesthetic aspect of screenshotting and (or, better, *as*) in-game photography, on the level of both the character and the player, is significant for my argument here – even if it manifests itself differently in both cases.

ing' [*sic*] or 'screengrabbing' is an umbrella term that defines a variety of in-game photography performances whose common denominator is the collection of visual mementos by the player. Rather than using a virtual gun to destroy the environments she or he encounters, the gamer becomes a collector, an avatar-with-a-photo-camera, a flaneur of virtual spaces. The collected pictures are subsequently enhanced with the aid of Photoshop and similar tools and shared online, via flickr or tumblr".[7] For many gamers, screenshotting has become an activity in its own right, with online realities now functioning, as explained by games scholar Cindy Poremba, as legitimate sites for photographic voyeurism. "If the process and ritual behind this image making is similar, the players themselves are validating the reality of their subjects simply by creating a document of these experiences. In this sense, players are taking real photos, just in virtual spaces",[8] argues Poremba. What allows Poremba to claim the ontological continuity of this new practice of image making with its light-induced predecessor is the continuity of function – but also, as noted by Seth Giddings, of affect and intentionality on the part of the players involved.[9]

My entry into gaming, both as a scholarly debate and a practice, was relatively recent, and took place via a passage through the contiguous worlds of philosophy, media theory and photographic arts. After many failed attempts to *get games* and *get into them* over the years, it was only with the arrival of the navigable "camera-body" as "the primary vehicle of perceptual immersion",[10] coupled with the development of a visuality that became intriguing enough for my own aesthetic preferences,[11] that

7 Matteo Bittanti: "The Art of Screenshoot-ing: Joshua Taylor, Videogame Photographer", in: *Mister Bit – Wired IT*, December 24, 2011; http://blog.wired.it/misterbit/2011/12/24/the-art-of-screenshoot-ing-joshua-taylor-videogame-photographer.html (last seen: December 20. 2021). For a further discussion of what constitutes in-game photography see Sebastian Möring and Marco De Mutiis: "Camera Ludica: Reflections on Photography in Video Games", in: Michael Fuchs and Jeff Thoss (ed.): *Intermedia Games – Games Inter Media: Video Games and Intermediality*, New York 2019, pp. 69–94.

8 Cindy Poremba: "Point and Shoot: Remediating Photography in Gamespace", in: *Games and Culture*, 2/1 (2007), pp. 49–58, here p. 50.

9 Seth Giddings: "Drawing with Light: Simulated Photography in Videogames", in: Martin Lister (ed.): *The Photographic Image in Digital Culture*, Abingdon 2013, pp. 41–55, here p. 46.

10 Rune Klevjer: "Enter the Avatar: The Phenomenology of Prosthetic Telepresence in Computer Games", in: Hallvard Fossheim, Tarjei Mandt Larsen and John Richard Sageng (ed.): *The Philosophy of Computer Games*, London, pp. 17–38. Accessed as a pre-print on the author's academia.edu page. I am grateful to Agata Zarzycka for pointing me towards Klevjer's work.

11 I would like to mention here the visually rich exhibition "Videogames: Design / Play / Disrupt", held from September 8, 2018 to February 24, 2019 at the V&A in London. Aimed

videogames presented an affordance which drew me in, in every sense of the word. And it is a desire to reflect on this affordance, offered (to me) by games such as Grand Theft Auto V[12] and The Last of Us, that forms the affective axis of this piece. Its conceptual framework builds on the argument originally developed in my book *Nonhuman Photography*.[13] Drawing on the scientific and philosophical research into perception, I outlined there, under the rubric of "the haptic eye", an ecological model of perception as a more embodied, immersive and entangled form of image- and world-formation. This model was inspired by the work of the psychologist James Gibson. His *The Ecological Approach to Visual Perception*[14] challenged the model of perception as transmission of an image from an object to the eye – and then the brain. In its place Gibson offered the idea that perception was mobile, distributed and kinaesthetic, and that it encapsulated the whole of the corporeal apparatus. In other words, vision for him required a movement of the perceiving agent's body, delivering simultaneous information about, and awareness of, "the world" and "the self in the world".[15] This foregrounding of the embodiment and embeddedness of vision ties in with the concept of "the haptic visual" proposed by Eva Hayward.[16] According to Hayward, vision should be figured "as touch, not distance, as entwined with, or negatively curving in loops and frills, not surveying from above".[17] This re-figuration of vision "as a becoming-with or being-with, as opposed to surveying-from",[18] to use Donna Haraway's term, has consequences for our epistemologies and ontologies. It offers a more dynamic and engaged, less conquering, model for being in the world, while also severing the link between the eye, the camera and the gun.[19]

at gamers and non-gamers alike, it offered a unique take on the genre by focusing on games' design and aesthetics.

12 *Grand Theft Auto V* (2013), Rockstar Games, PlayStation 3.

13 The argument that follows in this paragraph is developed from Joanna Zylinska: *Nonhuman Photography*, Cambridge / Mass. 2017, pp. 37–45.

14 Gibson, James J.: *The Ecological Approach to Visual Perception*, Boston 1979.

15 Gibson: *The Ecological Approach to Visual Perception*, op. cit., p. 187.

16 Eva Hayward: "Fingeryeyes: Impressions of Cup Corals", *Cultural Anthropology* 25/4 (2010), pp. 577–599.

17 Donna Haraway and Martha Kenney: "Anthropocene, Capitalocene, Chthulucene: Donna Haraway in Conversation with Martha Kenney", in: Heather Davis and Etienne Turpin (ed.): *Art in the Anthropocene: Encounters among Aesthetics, Politics, Environments and Epistemologies,* London 2015, p. 258.

18 Ibid.

19 As Lyle Rexer explains in *The Critical Eye: Fifteen Pictures to Understand Photography*, Bristol 2019: "Enshrined in modern mythology is the image of the street photographer, the boulevardier, usually a male, making pictures as he goes, shooting, and moving on, a tactical animal on the hunt", p. 59.

In line with this latter proposition, screenshotting, a process where the game player either captures the screen by using the screen capture-function *or* uses the camera or camera-function provided within a game to capture a scene from the point of view of the playing character, should perhaps be renamed as screencutting. Even though a certain violence is implied by both terms, cutting involves a more multi-dimensional and less targeted operation. Its endpoint is not the arrival of a bullet (or bullet-like ray of light) that razors the world into submission, but rather the creation of a temporary 3D shape that subsequently becomes flattened and recognized as an image. The experience of capturing screens, in whole or in part, as images in a 3D game environment arguably allows us to move beyond the camera / shutter model of perception, enacted by supposedly fixed eyes which neatly slice the world into stills. This model, which was widely upheld up until the mid-nineteenth century but whose shadow still lingers in many contemporary conceptualisations of vision as stable, acute and anchored, was based on the architecture of the camera obscura. The camera obscura's monocular aperture became "a more perfect terminus for a cone of vision, a more perfect incarnation of a single point than the awkward binocular body of the human subject".[20] In-game camera activity can allow us to reclaim and reengage the body's mobility and awkwardness. It can do this not so much by offering a prosthesis of vision in the gameworld but rather by becoming "an extension of our moving-and-perceiving body, in its dual nature as both subject and object in the world".[21] As well as allowing for an experiential enactment of some learned behaviors around perception, vision, mobility and action in a controlled environment of the game, gaming can also facilitate the exploration of framing as a corporeal-conceptual device for organizing the world.

Framing is of course an artifice, as the world does not present itself to us in frames – although there is no verifiable theory of how it does present itself to us. In other words, neuroscience has not yet been able to explain how nerve impulses, or sodium and potassium molecules flying across a membrane, produce subjective perceptual experiences *for us*. Also, any attempt to describe, capture and measure the world is inevitably entangled with the very devices, be they human or machinic, that undertake the process of description, capture and measurement.

[20] Jonathan Crary: *Techniques of the Observer: On Vision and Modernity in the Nineteenth Century*, Cambridge / Mass. 1990, p. 53.

[21] Klevjer: "Enter the Avatar: The Phenomenology of Prosthetic Telepresence in Computer Games", in: Fossheim, Larsen and Sageng (ed.): *The Philosophy of Computer Games*, op. cit.

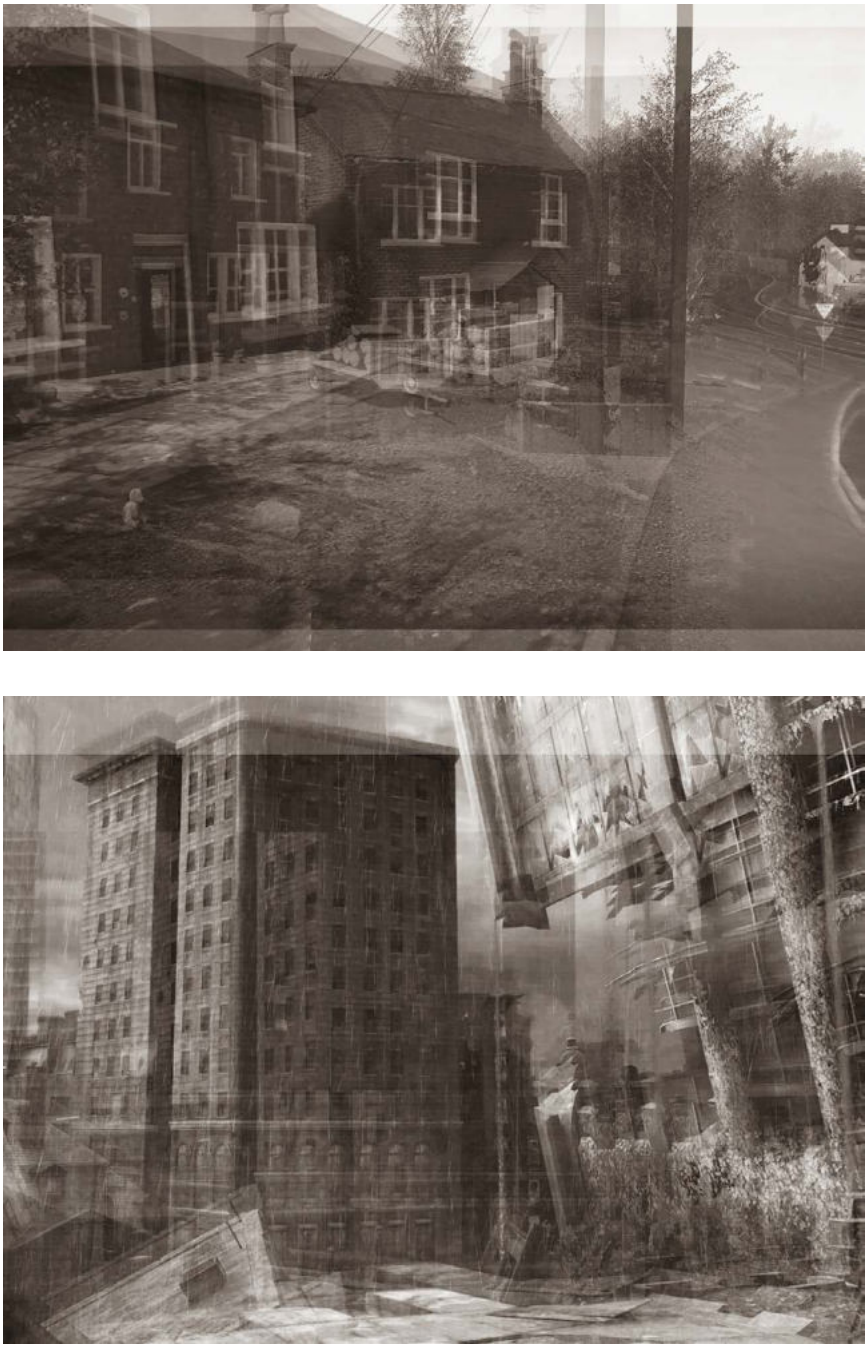


Fig. 1: EGR-6 and Fig. 2: TLOU-1 from *Flowcuts*, 2020.

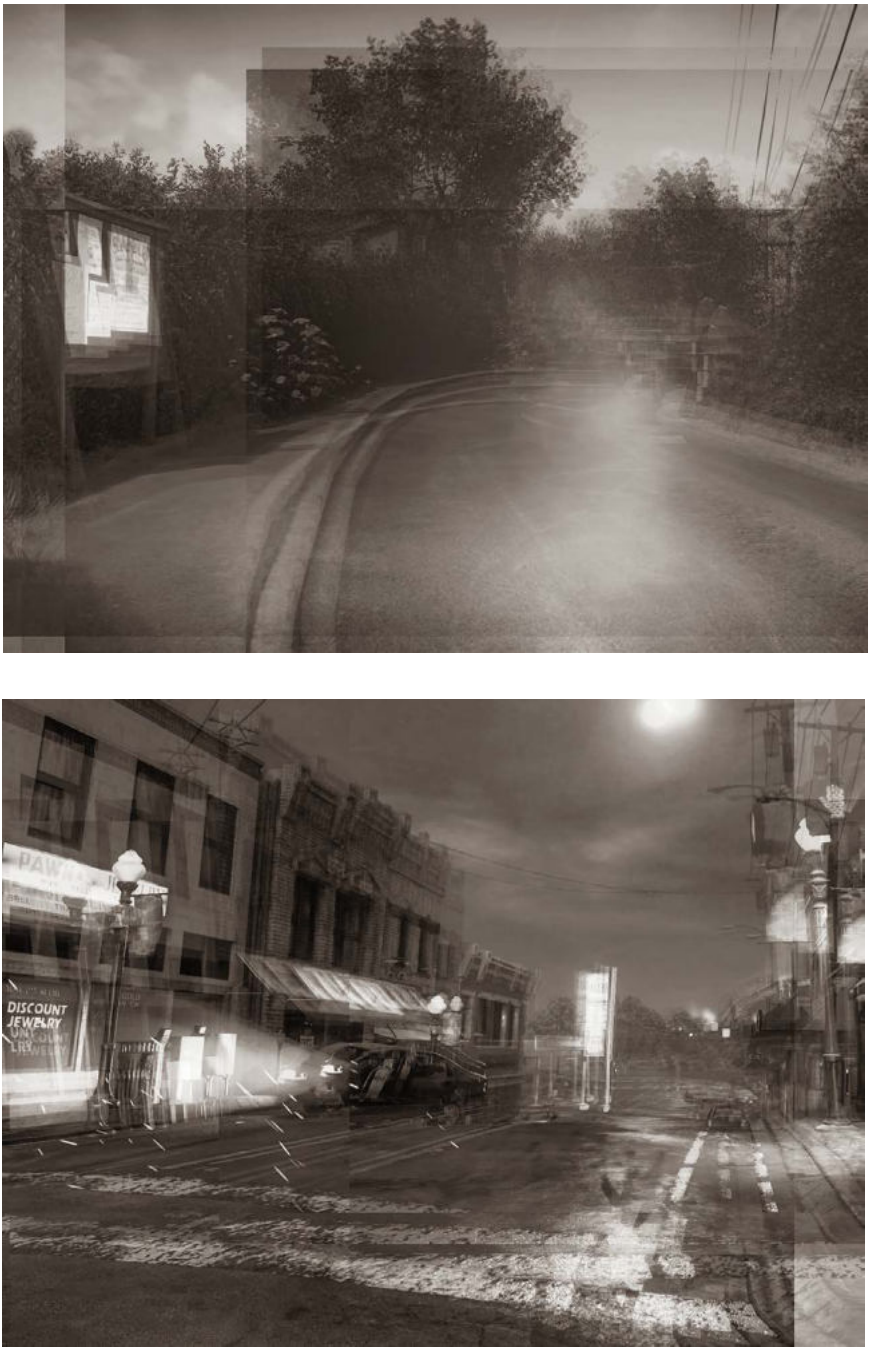


Fig. 3: EGR-2 and Fig. 4: TLOU-2 from *Flowcuts*, 2020.

Framing is an important part of this process, especially as knowledge and understanding, produced increasingly today in a visual form, often come to us framed, from the rectangle of the book block to the square of Instagram. We could therefore go so far as to suggest that we frame the world in rectangles not because our visual apparatus encourages us to do so, but rather because rectangular frames, in the shape of mirrors, windows, books, and pictures, are already part of our established epistemological repertoire.

Cutting the gameworld into rectangles and squares, screenshotting in gameworlds offers gamers an opportunity to enact the fantasy of the early industrial age: that of becoming an eye. With its antecedents in the plethora of optical instruments – such as opera glasses, bi- and monoculars, and spyglasses[22] – made for the pleasure of the eighteenth-century urban voyeur, this fantasy has been re-channelled by many recent experiments, from the ill-fated Google Glass through to wearable cameras such as Autographer or GoPro. Indeed, the frequency and semi-automation with which camera phones are now used have created a situation in which perception, experience and thus consciousness are permanently coupled with framing and capturing the world through a handheld rectangular glass device. The artificial, laboratory-like aspect of the game environment is therefore getting ever closer to the experience one has in the world *outside* the game. Game theorist Rune Klevjer argues that in "navigable 3D environments, the main 'body' of the avatar, in the phenomenological sense, is not the controllable marionette itself (for example Mario or Lara), but the navigable virtual camera, which becomes an extension of the player's locomotive vision during play".[23] 3D games can thus be said to facilitate the enactment of a mediated desire for *becoming an eye*: that of *becoming a camera*. There is a long history of artists experimenting with image-making and vision in this way, from Alexander Rodchenko's and László Moholy-Nagy's adoption of the floating viewpoint of a bird or the angular perception of an insect through to Lindsay Seers literally becoming a camera by taking photos with her mouth.[24] In gameworlds,

[22] See Hanneke Grootenboer: *Treasuring the Gaze: Intimate Vision in Late Eighteenth-Century Eye Miniatures*, Chicago 2012: pp. 82–88.

[23] Klevjer: "Enter the Avatar: The Phenomenology of Prosthetic Telepresence in Computer Games", in: Fossheim, Larsen and Sageng (ed.): *The Philosophy of Computer Games*, op. cit.

[24] Rodchenko and Moholy-Nagy were involved in photographic experiments aimed at displacing human vision by adopting the floating viewpoint of a bird or the angular perception of an insect. These radical new viewpoints amounted to what Moholy-Nagy described as a 'New Vision', which the new society in the then nascent modern era required, according to his revolutionary intimations. Seers' *Human Camera* project, in which she literally becomes a camera by taking photos with her mouth, an activity which I previously read as enacting

this artist is no longer avant-garde, and they are not even an *artist* any more. In the plethora of possibilities and angles on offer – 2½D, over the player's shoulder, camera-centred behind the player, unbroken first-person perspective, perspective switch, freelook – screencutting allows *any* player to produce a multi-perspectival, multilayered tissue of images that are a direct result of them approaching a scene in a certain way, be it from within the game (as a character) or from outside (as a player). The images produced are therefore an outcome of the interwoven and mutually constitutive ecologies of perception and ecologies of media. With this proposition I am adopting a somewhat different stand, and a more fluid understanding of photography, to the one proposed by Giddings, for whom in-game photography is just a simulation of photography, its "mere trace", or "ghost",[25] because it does not emerge as a result of light's direct impact upon the sensitive surface. It is thus rather a form of "virtual heliography", freezing the game's virtual environment as a picture. For me the image-making act is not confined to what happens on the screen on the level of screen or code: it encompasses the whole environment in which the gamer, the game and the gaming platform are located. Light is of course never absent from this process – which is what allows me to treat it as an extension of photography rather than just its mere trace.

In-game photography in the simulated space of the gameworld also allows for the denaturalization of perception: it reconnects the perceiving agent with the mechanics of its perceptive apparatus, while foregrounding the latter's technical aspects. It is therefore perhaps more apposite to say that screenshotting not so much *de*naturalizes as, rather, *de*mechanizes perception as a specific learned behaviour. It also reframes being in the world as being a sensing agent, one whose openness to the world comes not just through the primary senses such as the eyes or ears but also through the distributed perceptive multi-organ that entails the whole body – one that gets referred to, perhaps somewhat reductively, as *the brain*. It thus allows us to see better – and to understand seeing both corporally and as a haptic process.

This kind of experience could be undertaken in a different visual environment – and an immersive art installation using VR or AR or even a city walk, not to mention a walk *with a camera*. However, the

the inherently photographic nature of life itself (see Zylinska: *Nonhuman Photography*, op cit., pp. 75–77).

[25] Giddings: "Drawing with Light: Simulated Photography in Videogames", in: Lister (ed.): *The Photographic Image in Digital Culture*, op. cit., p. 42.

photographic act as it is traditionally conceived, especially in street photography, remains too tied to the masterful notion of capturing a Cartier-Bressonesque "decisive moment", a flattened picture that looks like a disembodied snapshot of a reality unfolding *out there*, rather than an outcome of an active process of the photographer cutting into the optic flow with their complex perceptive-technical apparatus to produce such an image. For Gibson, the optic flow refers to the apparent flow of objects experienced by the observer in their visual field as they move through space.[26] What thus tends to get forgotten or overlooked in traditional photography is the dynamic relationship between the optic flow – which is also a potential media flow – and the perceiving subject. In *The Critical Eye: Fifteen Pictures to Understand Photography*[27] Lyle Rexer claims that the majority of attitudes to the photographic medium since its nascence have assumed "an independence for the photographer, a sovereign position of outsider and roving eye. They also assume the self-sufficiency of each captured moment, as if it were distinct, discontinuous, and capable of containing whatever might be significant about the reality of that place and time".[28] It could therefore be argued that in its early incarnation the photographer's physical and technical corpus all converge to become a disembodied eye.

Both embracing and eliding the experience of mediation, the game environment stages worldliness for us as a mobile task to explore and engage with, with players' eyes, hands, brains and bodies all participating in seeing *and / as* doing. In *Mobile Screens: The Visual Regime of Navigation* Nanna Verhoeff suggests that "interaction with screen-based interfaces already entails a performative, creative act".[29] She goes on to argue that in the visual regime of navigation movement itself is both performative and creative because it "not only transports the physical body, but affects the virtual realm of spatial representation. This implies a temporal collapse between making images and perceiving them".[30] Here perception reveals itself to be an inherently creative task. Screenshotting, I thus would like to suggest, can offer a corrective to the representationalist understanding of photography by reversing the schema: in the game *the whole body becomes a camera*, with the photographer's eye extended beyond the optical apparatus with its line of vision to reach onto the world in a more dynamic and enfolded way.

[26] See James J. Gibson: *The Perception of the Visual World*, Boston 1950.
[27] Rexer: *The Critical Eye: Fifteen Pictures to Understand Photography*, op. cit.
[28] Ibid., p. 59.
[29] Nanna Verhoeff: *Mobile Screens: The Visual Regime of Navigation*, Amsterdam 2012, p. 15.
[30] Ibid., p. 13.

We could thus go so far as to say that, paradoxically, the mediated experience of being in a videogame denaturalizes the enculturation of photographic image-making as the objective representation of reality, while also opening up the apparatus beyond the eye-hand-world triangle. Once again, in-game photography is particularly predisposed to undertake this process of repositioning human perception as ecological because the camera in the game is often invisible. Indeed, as mentioned earlier, in many instances the whole body becomes, or maybe even *morphs with*, a camera because walking is already an actively engaged mode of seeing and sensing. In certain first-person games a reversal of this process also occurs, with the camera *becoming a body* by simulating the body's functions without the need for any actual presence of the body on the screen – because the camera is already enacting those functions.[31] The coupling of the activities of walking, seeing and sensing that result in the production of what Poremba has called a "camera avatar"[32] is actually imperative for the survival of the playing character in many games: otherwise, they simply get shot. Screenshotting thus allows the (insubordinate) player to escape, at least temporarily, the logic of screen shooting that many games are premised on by allowing them to linger in in-between spaces not designed for action. By slowing down the game and spending *unnecessary* time in such spaces, the player learns, via their character, how to navigate the world, while also taking on and enacting perception with their whole body.

To sum up, in-game photography in 3D gameworlds offers more than an intellectual lesson in theories of perception: it also works as a form of corporeal training, allowing players to embrace and enact seeing as haptic. Such knowledge can serve them both on- and offline. Last but not least, training humans by means of videogames to see and understand seeing better can also offer a valuable lesson for designers of machine vision systems, be those employed in driverless cars, industrial automation systems or security monitoring, whose goal is to emulate human vision as closely as possible. Would one way of achieving this be to deploy machine vision algorithms to play more videogames – and to see what kinds of cuts they would make in their gameworlds?

[31] I am grateful to Sebastian Möring for making this point to me.

[32] Poremba: "Point and Shoot: Remediating Photography in Gamespace", in: *Games and Culture* 2/1, op. cit., p. 2.

Coda

This article features several images from my own in-game photography project called *Flowcuts*, which developed alongside the writing of this text. In a somewhat uncanny turn of events, I took first steps towards exploring perception and gaming in 2018, but the majority of the *Flowcuts* images were made in early 2020. This meant that I was reviewing this article and screenshotting the gameworlds that had been abandoned by their inhabitants as a result of some vaguely specified global-scale pandemics in the games The Last of Us Remastered[33] and Everybody's Gone to the Rapture,[34] while witnessing the progression of the COVID-19 pandemic across the globe. This premonitory convergence of the virtual and the real foregrounds the fact that, in any kind of political or existential crisis, the problem of perception, of our bodies and minds interacting with the world of which they are part to make meanings and interventions in it, remains fundamental. The questions raised by the practice of screenshotting – How do we see what is around us? How do we frame what we see? And how can we reframe it? – become particularly poignant during such crises.

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[33] *The Last of Us Remastered* (2014), Sony Computer Entertainment, PlayStation 4.

[34] *Everybody's Gone to the Rapture* (2015), Sony Computer Entertainment, PlayStation 4.

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Poremba, Cindy: "Point and Shoot: Remediating Photography in Gamespace", in: *Games and Culture* 2/1 (2007), pp. 49–58.
Pokémon Go (2016), Niantic, iOS, Android.
Rexer, Lyle: *The Critical Eye: Fifteen Pictures to Understand Photography*, Bristol 2019.
The Last of Us (2013), Sony Computer Entertainment, PlayStation 3.
The Last of Us Remastered (2014), Sony Computer Entertainment, PlayStation 4.
Verhoeff, Nanna: *Mobile Screens: The Visual Regime of Navigation*, Amsterdam 2012.
Zylinska, Joanna: *Nonhuman Photography*, Cambridge / Mass. 2017.



THE SWAMP

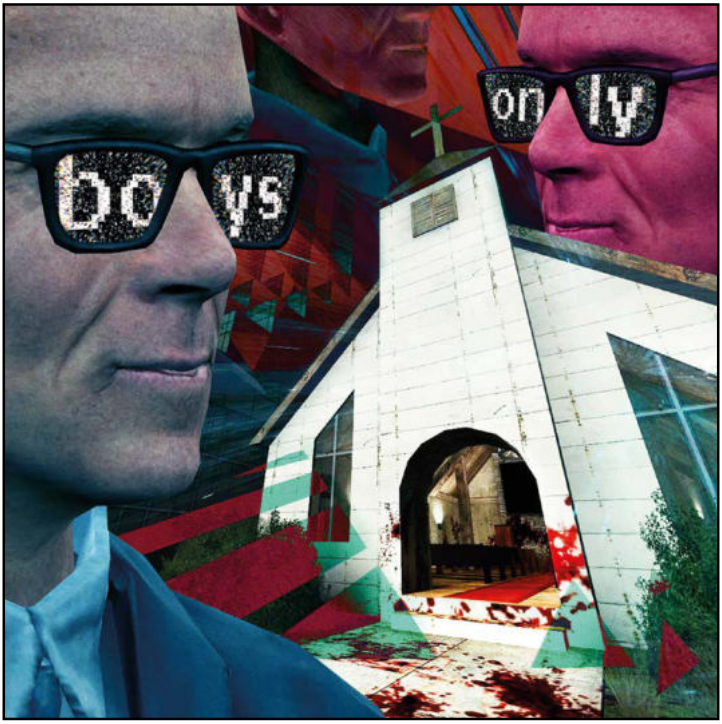
KENT SHEELY, 2021

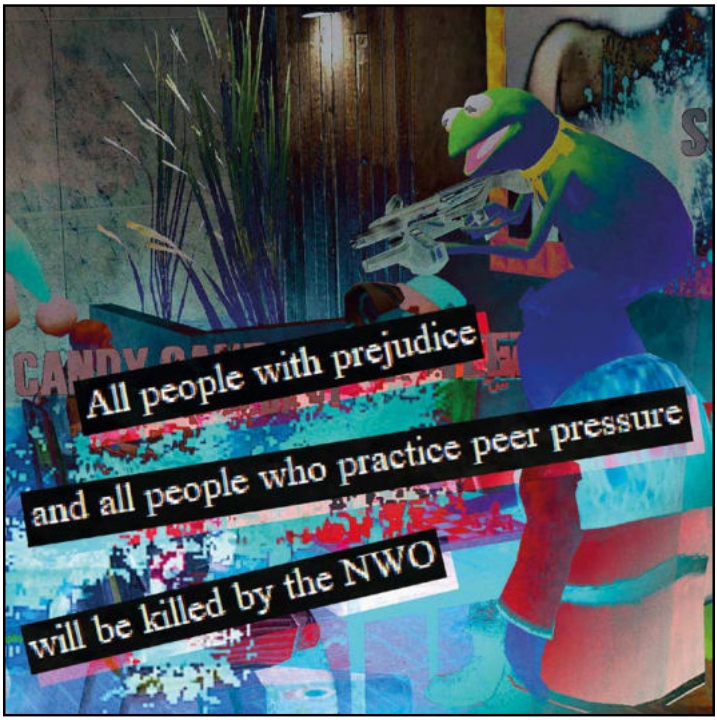
Within GARRY'S MOD[1], a multiplayer sandbox game that allows players to build their own worlds and socialize, there is a server whose centerpiece is a movie theater sitting in the middle of a swamp (hence its name, Swamp Cinema). The core gimmick is that the theater is functional, allowing visitors to load videos onto the various screens and share them with anyone in the same room, but the grounds also house more deliberately provocative setpieces, many of which are themed around former president Donald Trump and feature "edgy" humor. It was clearly designed to attract and cater to players who have been shaped by the darker corners of the Internet, and it succeeds. There are very few rules about conduct and language, and players can make themselves look like almost anything, so you never know who or what you'll run into.

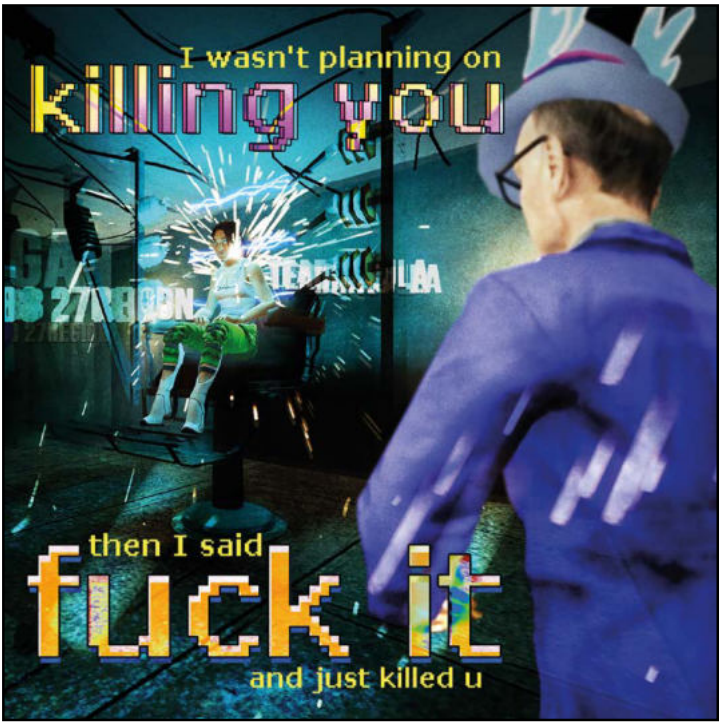
After discovering Swamp Cinema I engaged with it as a photojournalist, capturing the most absurd interactions I've ever seen in a video game. I left most of my shots unedited, but I also began to cut the images apart and remix them into new compositions, combining them with snippets of the text-based chat to create a more complete abstraction of my experience.

[1] *Garry's Mod* (2006), Valve, Microsoft Windows.


if i die
everyone
dies


bo
ys
on
ly


All people with prejudice
and all people who practice peer pressure
will be killed by the NWO

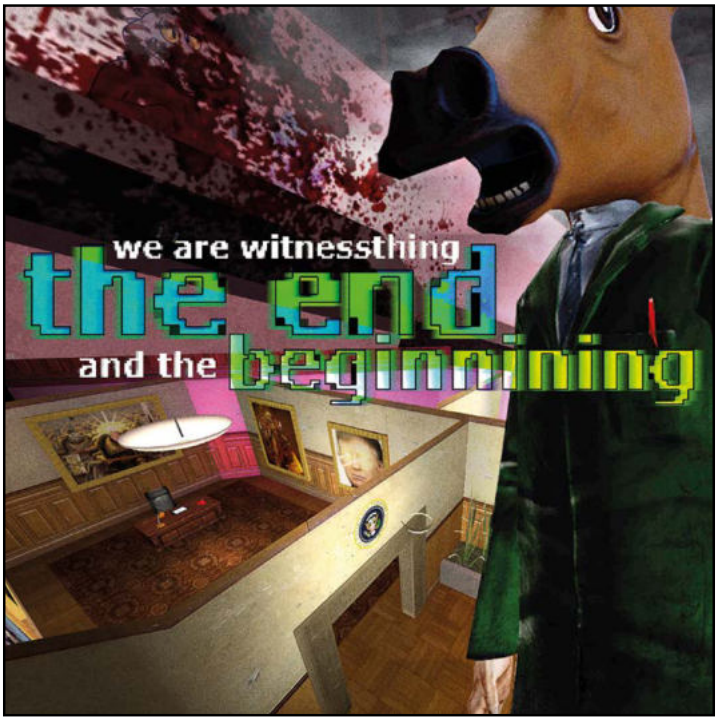

I wasn't planning on
killing you
then I said
fuck it
and just killed u


sadly
i couldnt make it
to the moon


thta's hot
YOUR WELCOME


we secretly hate each other
and ourselves
Disconnect:
------=====[BANNED]=====------
--= Reason =--
Raid without advert/LTARP
--= Time Left =--
2 hours
Close


everyone here
is like that


we are witnessthing
the end
and the beginnining


sometimes
we have to be
deaded
to become
alive

Ansel and the (T/M)aking of Amateur Game Photography

Cindy Poremba

In many ways it is not surprising to see photography emerge as a practice in videogames. Games host experiences both lived, and live, and have the capability of presenting intentionally photorealistic environments with emergent behaviours. They present a "flow and flux of everyday life"[1] from which to fix unique moments of time. And increasingly, videogames present complex, emergent environments generative of any number of singular images. Yet, as Martin Hand argues, "Photography may be everywhere, but it is not everywhere in the same way."[2] In a postmedia era, where the core practices, technologies and values have become detached from the materiality of a film camera, photographies are assembled. Less an ontological object, photography serves more as a container for stabilizing understanding. Hand describes photography now as a set of "integrated sociotechnical practices – practices which combine discursive, material and image-based elements in potentially different ways, framed by historically specific, diverse interests and contexts."[3] The question is not *whether* photography exists in games, but *how* it exists in games. What photography – or even, photographies – might games hold?

Since the early 1990s, media has become increasingly subsumed within the logic and materiality of digital computation. Of the many implications of this transformation, one of the most notable has been an accelerated, perpetual reassembly of form and affordance, disrupting previously held boundaries surrounding various media types, and challenging media specificity bound to relatively stable material constructs. The term *postmedia* has been used to conceptualize such material, cultural and conceptual transformations.[4] Within a postmedia framework, it no

1 Ron Burnett: *Cultures of Vision: Images, Media, and the Imaginary,* Bloomington 1995, p. 56.

2 Martin Hand: *Ubiquitous Photography*, Cambridge / UK 2012, p. 12.

3 Ibid., p. 56.

4 See, for example, Lev Manovich: "Post-Media Aesthetics", 2001, http://manovich.net/index.php/projects/post-media-aesthetics (last seen: March 14, 2021); Peter Weibel: "The Post-Media Condition", in: *AAVV, Postmedia Condition*, Cat., 96, Madrid 2006, http://www.metamute.org/editorial/lab/post-media-condition (last seen: March 14, 2021); Dominic Quaranta: "The Postmedia Perspective", in: *Rhizome* (2011) http://rhizome.org/editorial/201 n1/jan/12/the-postmedia-perspective/ (last seen: March 14, 2021).

longer makes sense to define a "pure" photography based on the affordances of a lens-and-film-based camera, nor to base an understanding of photography solely on practices using this technology. Photos can be taken within simulated, virtual worlds, using tools that need not bear any resemblance to a camera. Photography as a practice can travel readily across media platforms to combine with a social network application, for example. Even a "traditional" digital camera can also serve as a video capture device and, as Craig Hight details, can be "aided by automated and semiautomated software, with algorithmic tools evaluating the light conditions, detecting faces in the frame, automatically determining the optimal settings for elements such as focus, shutter speed and flash to produce the best snapshots."[5] The common digital materiality of almost all postmedia forms allows for an unprecedented amount of exchange and interoperability, making it almost impossible to maintain essentialist notions of particular media types.[6]

Post-photography, a subset of postmedia discourse, refers to a number of shifts brought about by the technological and cultural impact of the digital on photography.[7] Early post-photography discourse tended to set up contrasts between the analog and the digital, virtual and material – for example, George Legrady argued that a digital photograph is merely a simulation of a photograph, based on captured data simply designed to look like the product of a traditional camera, data that could look like anything (a visualization, a number set, etc.).[8] Legrady's implication here is that a real photograph is that one being simulated, with its own appearance and function causally bound to its materiality. Our current milieu, described by Hand, represents a stage of late post-photography, where the upheaval caused by these shifts no longer directly references analog photography as its alter, but has become mundane and is now simply a part of lived experience. In other words, the fragmentation of

5 Craig Hight: "Indexicality in the Age of the Sensor and Metadata", in: Gerda Cammaer, Blake Fitzpatrick and Bruno Lessard (ed.): *Critical Distance in Documentary Media*, Cham 2018, here p. 26.

6 For Weibel (Weibel: "The Post-Media Condition"), ironically this allows for a more prominent differentiation of media types, as the simulation of all forms on a computer means that the desired shapes of these forms are unbound from material constraints and can be made to match ideals (for example, if the aesthetic of grain is preferred for film images, this can readily be simulated in high fidelity that may even exceed the material affordances of the source).

7 See William J. T. Mitchell: *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*, Cambridge / Mass. 1992; and Geoffrey Batchen: *Burning with Desire: The Conception of Photography*, Cambridge / Mass. 1999.

8 George Legrady: "Image, Language, and Belief in Synthesis", in: *Art Journal* 49/3 (1990), pp. 266–71.

technologies, aesthetics, practices and desires surrounding photography are no longer contingent on pre-digital conceptions of photography.[9] To paraphrase Geoffrey Batchen, post-photography consists of images and practices that *look like* photography.[10] Yet this does not necessarily mean they always look like one *particular* photography, or one singular understanding of what it means to take a photograph. Our understanding of photography is assembled from a network of detached practices, histories and epistemologies into a configuration that fits the working context; and as a result, what a photo is only makes sense in these local tangles of meaning, materiality and practice.

This work looks to situate in-game photography, the creation of photographic images from within videogame environments, as an artifact of late post-photography: the construction of photography within the ludic. Specifically, it looks at the playful construction of in-game photography within the context of competitive and amateur photography, in relation to one emerging technical infrastructure supporting this: NVIDIA's[11] game photography / professional screen capture tool Ansel.[12] Taking the lead from Martin Hand, I will present an examination of the materiality (through platform analysis), discourse (through frame analysis) and images (through visual analysis) surrounding NVIDIA Ansel as entities that are entangled into a particular shape of photography. Referencing the historical gendering of amateur photography, a key point of focus is placed on elements that make visible gendering, or gendered constructs, reconstructed or re-performed within these entanglements. This framing aims to present a lens on in-game photography that entangles platform affordances, a discourse meant to invoke particular photographic understandings, and a re-emergence of the values and practices found in competitive amateur photography. While each small-scale analysis may lack the scope to suggest determinate conclusions on its own, taken together these analyses begin to rough out one particular instance, or shape, of photography, from which we might draw broader insights.

Lev Manovich has argued that the expectations set by computational mutability, part of what we've aligned earlier with postmedia, extend to

[9] Pragmatically speaking, you don't need to reference an analog camera at all in order to make sense of photography (like the little hand-receiver icon on your phone, this pre-digital signposting is increasingly unintelligible).

[10] Batchen: *Burning with Desire: The Conception of Photography*, op. cit.

[11] NVIDIA is a US-based multinational company primarily known for its design of graphics processing units (GPUs).

[12] NVIDIA uses both *NVIDIA Ansel* and the singular *Ansel* interchangeably to describe this toolset.



Fig. 1: Kent Sheely: From *World War II Redux*, 2009.

the cultural layer, in which "every choice responsible for giving a cultural object a unique identity can potentially remain always open."[13] While the ontological status of photography may be unstable, the "shape" of photography is evoked in particular circumstances for situated purposes. In-game photography has taken on a variety of shapes, even within its short span. One such shape is the performative enactment of photography practices (digital and non-digital) in game spaces. Enactment here is not meant to highlight artificiality or theatre, but instead the enactment of practices familiar or framed as photographic. In its most literal form, photographic enactment involves the recreation of specific aesthetics, styles, practices and known photographs. An example would be the work of Kent Sheely, specifically, his *World War II Redux*[14] series of in-game photographs. These images re-create not only the composition, but a simulated materiality of well-known WWII photographs,[15] for example, the film and blur that characterizes Robert Capa's war photography.[16]

[13] Lev Manovich. *The Language of New Media*, Cambridge / Mass. 2001, p. 44.

[14] Kent Sheely: *World War II Redux*, 2009, https://www.kentsheely.com/world-war-ii-redux/index.html (last seen: March 14, 2021).

[15] Including famous photos by Joe Rosenthal and Robert Capa that themselves are the subject of debates surrounding photographic authenticity.

[16] Sebastian Möring and Marco De Mutiis: "Camera Ludica: Reflections on Photography in Video Games", in: Michael Fuchs and Jeff Thoss (ed.): *Intermedia Games – Games Inter Media: Video Games and Intermediality*, New York 2019, here p. 84.

Another example would be Roc Herms' re-enactments[17] of Ai Weiwei's *Study of Perspective*.[18] This shape is the most literal performance of photography in digital games, and one with a rare explicit reference to specific instances of photography. Other in-game photography practices center on particular styles, such as Daniel Latzel's *At War With the Obvious* series,[19] taken within Grand Theft Auto V, in the style of William Eggleston.[20] On the level of practice, we can see a number of projects that adopt the conceit of photojournalism or street photography, commonly contrasting the photographer's "real world" and "in-game" practices.[21]

However, as in-game photography develops as a form, we can see a more eclectic entanglement of sociotechnical practices, often emerging from different sources but oriented towards specific interests and contexts. These shapes are simultaneously familiar and alien, logical and discordant, but ones in which we can often recognize a pattern of entities and stabilities that have a tendency to emerge in particular instances of photography. One such shape is that of amateur photography, or perhaps closer to what Alise Tifentale and Lev Manovich term "competitive photography": amateur photography focusing on technical mastery and rules-based play, validated by peer critique. As Tifentale and Manovich outline, "Competitive photography is aimed at the audience consisting of a peer group of more or less like-minded photographers, and the images circulated within this group are discussed and evaluated primarily on the basis of the mastery of photographic technique, aesthetics, and creativity (unlike, for example, family photography that is circulated among relatives and which is discussed in terms of events and people depicted)."[22] They suggest this more competitive strain of amateur photography may manifest through the social ranking of camera clubs, as well as photo contests, and, in contemporary contexts, photo-ranking platforms like

17 Roc Herms: *Study of Perspective*, 2015, http://www.rocherms.com/projects/study-of-perspective (last seen: March 16, 2021).

18 Ai Weiwei: *Study of Perspective*, 1995, https://www.moma.org/collection/works/117098.

19 Daniel Latzel: *At War With the Obvious*, 2016, In-Game Photography, http://www.digarec.de/2021/06/07/the-real-virtual-digarec-in-game-photo-gallery/ (last seen: June 30, 2022).

20 *Grand Theft Auto V* (2015), Rockstar Games, Microsoft Windows.

21 See, for example, Benoit Paille in Winfried Gerling: "Photography in the Digital", in: *Photographies* 11/2–3 (2018), pp. 149–67, or Ashley Gilbertson in Ashley Gilbertson and Josh Raab: "A War Photographer Embeds Himself Inside a Video Game", in: *Time LightBox*, 2014, http://time.com/3393418/a-war-photographer-embeds-himself-inside-a-video-game (last seen: March 16, 2021).

22 Alise Tifentale and Lev Manovich: "Competitive Photography and the Presentation of the Self", in: Julia Eckel, Jens Ruchatz and Sabine Wirth (ed.): *Exploring the Selfie: Historical, Theoretical, and Analytical Approaches to Digital Self-Photography*, Cham 2018, here p. 171.

Instagram. Although the conceit of photography in this context may be its "artistic quality," the engine of this evaluation comes from works that are validated, or "scored," typically in relation to rules of photography (subject, genre and technique matching similar to what is described in Bordieu[23]), as well as rules of composition, and technical mastery.

While this tendency can be magnified by online platforms, it is important to note this competitive strain of photographic practice has long run through amateur photography, and has roots in its emergence. Amateur photography rose in part through gatekeeping. On one hand, amateur photography is a shift away from lack of artistry in professional, instrumental photography – for example, the once common studio "family" photo. On the other, it is a shift away from the sentimentality and banality of snapshots and other vernacular photographic practices that arose in response to the increased accessibility of photography.[24] It is in relation to the later that we also see a gendering of amateur photography practice. "Snapshooters" were commonly conceived as women, with mass commercial cameras such as the Kodak Brownie explicitly marketed as easy to use point-and-shoot tools for capturing family memories.[25] In contrast, the serious amateur photographer, typically gendered masculine,[26] mobilized more sophisticated photographic machinery (a tendency that we can see echoed today in the demand for "prosumer" equipment such as SLR cameras), and was educated and proficient in the rules of photographic composition, genre, and (to a limited extent) notable photographers.[27] Technical mastery continues to play a role in "elevating" amateur from vernacular photography. The masterful operation of a sophisticated photographic machine provides skill gating and shifts focus from luck to successful execution. Amateur photography groups can be seen through this lens as a site for exchanging and reinforcing this ruleset, and using it as a measuring stick for evaluating the "artistic quality" of photographs.[28]

A further example of shifting photographic entanglements can be seen in refigurings of traditional photographic conceptions such as Henri Cartier-Bresson's "decisive moment." The decisive moment is

[23] Pierre Bourdieu: *Photography: A Middle-Brow Art*, Stanford 1990.
[24] Annebella Pollen: *Mass Photography: Collective Histories of Everyday Life*, London 2016, p. 155.
[25] Marc Olivier: "George Eastman's Modern Stone-Age Family: Snapshot Photography and the Brownie", in *Technology and Culture* 48/1 (2007), pp. 1–19, here pp. 2–3.
[26] Hand: *Ubiquitous Photography*, op. cit.
[27] Bordieu: *Photography: A Middle-Brow Art*, op. cit.
[28] Alise Tifentale: "Art of the Masses: From Kodak Brownie to Instagram", in: *Networking Knowledge: Journal of the MeCCSA Postgraduate Network* 8/6, pp. 1–16.

the split-second capture that reveals the essence, or truth behind a subject, in its "proper expression."[29] In game design, chance and skill are often framed as tensions, with chance (at least in contemporary games) commonly positioned as a lesser dynamic, more suitable for games involving novice players or children, where skill is elevated as a more sophisticated dynamic for gamers.[30] The decisive moment is an interesting concept to revisit in postmedia discourse, if only for the way it attempts to re-inscribe chance as a matter of patient, skillful practice, ultimately resulting in the revelation of a higher truth in the image.[31] Once an affordance of photographic machinery (itself magnified by the liberation of photographic equipment from highly interventionist studio contexts), the decisive moment is now conventional, not a material constraint. Decisive moments are now selected while shopping through a database of frames captured via a camera burst, not a skillful execution of a sharp eye (note this is also not new, despite the romantic notion of the one-shot capture, photographic practice is in part a matter of curation). It exists as a vestigial pattern echoing the shape of photographic practice at the interplay between chaos and control. However, the boundaries between what the appropriate balance is of these elements is constructed discursively: in community standards policing what kind of editing is allowed, or what camera tools are seen as "cheats." Within in-game photography, a creator community maintaining the value of the decisive moment may insist on images occurring within real-time gameplay, for example. A community that privileges image construction, over capture, may readily dispense of this dynamic in order to possess more active control over the captured image.

Amateur in-game photography often bears some characteristics of both commercial and competitive photographic practice, but these characteristics are less remediated (in the sense described by Bolter and Grusin[32]) than they are continually negotiated in particular contexts surrounding game images. Creators in this space are typically not media artists per

[29] Henri Cartier-Bresson: *The Mind's Eye: Writings on Photography and Photographers.* New York 1999, p. 5.

[30] Lennart Nacke: "Chance and Skill in Game Design", in: *The Acagamic*, October 15, 2014, http://acagamic.com/courses/intro-to-game-design/chance-and-skill-in-game-design (last seen: March 14, 2021).

[31] Within in-game photography, this quality has been contested in the work of Eva and Franco Mattes (*Traveling by Telephone*, 2008, https://0100101110101101.org/traveling-by-telephone (last seen: March 14, 2021)), and tableau vivant works (such as described in Tommy Ting: "Playing Dead", in: *First Person Scholar*, June 12, 2019, http://www.firstpersonscholar.com/playing-dead (last seen: March 14, 2021)).

[32] Jay David Bolter and Richard Grusin: *Remediation: Understanding New Media*, Cambridge / Mass. 2002.

se (these practices are not usually situated in the context of either digital art or fine art photography, although they are sometimes drawn into these spaces). Duncan Harris is perhaps the most commonly referenced figure within this community (largely built up around early iterations of Harris' *Dead End Thrills* website[33]), and Harris himself identifies not as an in-game photographer, but as a "screenshotter." In fact, Harris has argued that aligning such work with photography obscures the "controlled, artificial and technological universe" in which these images are created.[34] Conversely, screen-capture (which for some may evoke a mental image of simply hitting the Prnt Scrn[35] key), may also belie the technical sophistication underlying the images most lauded in this photographic space. Amateur in-game photographers use customized scripts and filters to enhance the photographic image, and in many cases the actual image rendering (as developer / photographer Jesse Rapczak notes, "unlike the real world, how it looks depends on what hardware you are running it on"[36]). This adds a new layer from which to perform technical mastery. One of the most basic functions is freeing the camera (camera control is commonly constrained to character perspective in a game build[37]), followed by re-instantiating various engine controls. While some in-game photographers can get custom builds from game developers allowing for more control over the game environment they are capturing, others employ the use of game modding tools to access the control they desire in the creation of particular images.

Game companies acknowledge and validate the practice by including photo modes and advanced photo toolsets for players, like Ansel, while contributing to the epistemic framing surrounding these practices through both active and implicit framing. Named in reference to famed photographer Ansel Adams, a noted proponent of the electronic image, Ansel has been billed alternately as "a powerful photo mode that lets you take professional-grade photographs of your games" and "a revolutionary way to capture in-game shots and share the moment" (NVIDIA).

33 This community has now largely moved to discussion boards and platforms like Discord, as *Dead End Thrills* has been repurposed by Harris as a professional portfolio site.

34 Trevor Talley: "Dead End Thrills Talks Screenshots and Art", in: *Kill Screen*, January 26, 2015, https://killscreen.com/previously/articles/dead-end-thrills-talks-screenshots-and-art (last seen: March 15, 2021).

35 Spelling and stylization may vary.

36 NVIDIA GeForce: "Capture Stunning 360 Shots in ARK with Ansel!", November 10, 2016, https://www.youtube.com/watch?v=RhPQVaAetWM (last seen: March 15, 2021).

37 A game build is a self-contained, optimized and distributable package published from a game development environment. It typically does not contain the development files and structures that would make the game re-editable.

Operating within the network of possible postmedia photographies, it has emerged as a significant agent in instancing and stabilizing amateur photography practices in in-game photography.

The Ansel platform

> *I believe that the electronic image will be the next major advance. Such systems will have their own inherent and inescapable structural characteristics, and the artist and functional practitioner will again strive to comprehend and control them.*
>
> Ansel Adams[38]

The following section presents a small-scale platform analysis informed by platform studies and its complimentary discourses.[39] Platform studies can be defined as "a set of approaches which investigate the underlying computer systems that support creative work."[40] A platform analysis foregrounds the underlying structure of computational systems and their role in presenting affordances – what Matthew Fuller describes as their conditions of possibility.[41] Recent feminist critiques of platform studies[42] have sought to better integrate these insights into the broader entanglements (including politics and ethics) from which hardware and software are inextricable. Platform analysis, and the insights of platform and software studies, can provide a useful complement to discourse analysis and visual studies approaches. I will be using it to highlight the evolution of the Ansel platform, and its material affordances, through a critical explication of its technical elements in context.

Typically, the virtual worlds in which most modern games take place are only partially accessed by players. A game build places constraints on player access to the environment (in the service of structuring the game experience), and sets numerous performance limitations (often optimizations) to enable a smooth game experience across a broad set

38 Ansel Adams and Robert Baker: *The Negative*, New York 1995.
39 Such as software studies and media archeology.
40 Ian Bogost and Nick Montfort: "Platform Studies: Frequently Questioned Answers", in: *Digital Arts and Cultures Conference*, Irvine, December 12–15 2009, https://escholarship.org/uc/item/01r0k9br (last seen: March 15, 2021).
41 Matthew Fuller: *Software Studies: A Lexicon*, Cambridge / Mass. 2008, p. 17.
42 Aubrey Anable: "Platform Studies", in: *Feminist Media Histories* 4/2 (2018), pp. 135–40. Wendy Hui Kyong Chun and Sarah Friedland: "Habits of Leaking: Of Sluts and Network Cards", in: *Differences* 26/2 (2015), pp. 1–28.

of systems. To some extent these are adjustable on the user-end, but in other cases, the game build itself locks in hard parameters. For example, collision detection may prevent a player from walking through a wall. Models in the far background of a scene may be drawn in lower resolution, or even be billboarded (rendered as a static 2D image). Lighting may be baked in rather than dynamically generated. To circumvent these constraints, in-game photographers sometimes use custom builds of the games they photograph that, for example, have free cameras[43] not locked to the constraints of a particular perspective, or that have had particular performance optimizations removed or reduced. Those that cannot get access to custom builds may turn to hacking the game (using tools such as Cheat Engine[44]) to get access to additional visual information within the game, particularly to free the camera. For example, early versions of Duncan Harris' *Dead End Thrills* website would feature not only his captured images, but information detailing the specific techniques used to create these images, such as anti-aliasing enhancements and post-processing (shader) hacks.

Announced in spring 2016, NVIDIA Ansel is a platform for creating screen captures from digital game environments, contextualized as in-game photography. Ansel consists of two primary technical components: a development kit (SDK) that can be integrated via packages for game engines like Unreal and Unity and / or downloaded directly online, and a component of the NVIDIA GeForce graphics driver. The developer-side tools allow developers to authorize certain kinds of access to the data generated by their game, most notably access to the camera. These are then accessed by the NVIDIA driver or GeForce Experience middleware through particular hooks through the Ansel interface. The interface[45] is called up through a quick-key (keyboard shortcut) combination, and it allows players to modify the "photographic" parameters of the image through both liberating movement constraints and allowing access to select graphics buffers. These parameters are framed as "filters" (or occasionally "effects") but are an undifferentiated combination of photo editing tools (like you may find in Adobe Photoshop), and physical cam-

[43] Almost every work created using a game engine (regardless of whether the game is 2D, 3D, isometric, etc.) integrates a viewport onto the gameworld, using the metaphor of a cinematic "camera." This camera defines what is currently visible within the game environment.

[44] https://github.com/cheat-engine/cheat-engine (last seen: August 6, 2020).

[45] The interface follows NVIDIA's standard bright green accenting, and a black / grey palette that has become characteristic of professional media development interfaces, particularly in games.

era simulations (like lens and camera types). Players can take over the in-game camera (or a defined offset) to position themselves for a shot. Once the image is framed, players select "snap" to capture the image (the more common photographic term "shoot" would have likely been too confusing in the context of videogames). To capture images in high resolution,[46] Ansel uses a tile grid to take a series of smaller images and stitch them together algorithmically, and in later versions of the software, uses AI to smooth this process (for example, machine learning inference-based upres[47]). In recent versions features such as raycasting overrides have also been introduced, giving in-game photographers access to un-optimized simulated image data that can allow for more photorealistic image rendering (for example, more detailed and accurate shadows, light refractions, reflections, etc.). This level of image information often yields more photorealistic and "beautiful" images, in some ways bringing players closer to the game as envisioned, as opposed to the version that has been optimized for smooth gameplay.

What are the mechanics of a good in-game camera? NVIDIA in part borrowed from the pre-existing practices of in-game photography hackers. First is the ability to free the game camera from the constraints defined by the game developer. As noted earlier, a free or repositionable camera allows for viewing positions that extend beyond the possibility space of live gameplay, and paired with a static game environment, a greater degree of compositional control over the in-game image. Ansel also allowed in-game photographers to preserve more image data, through output modes such as 3D stereo, "super-resolution"[48] (NVIDIA's term for their resolution enhancement features) and HDR;[49] as well as specific export extensions with no, or limited, compression (such as RAW). Recent versions introduce significant improvements to shader access (allowing in-game photographers the ability to alter how the game visibly renders), and real-time raytracing (which among other things can allow

[46] A game's resolution is typically a function of how many pixels are contained within each inch of display (commonly described as DPI, or "dots per inch"). Screen resolutions tend to be far less than required print resolutions, so many "enhanced" resolution techniques attempt to construct a more high resolution image than actually exists for gameplay, for uses such as print.

[47] Upres (up res) is a resolution enhancing process predominantly used where higher resolution information is not available, and must be inferred from existing image data.

[48] As noted earlier, enhancing resolution is a means of generating additional pixel data than is initially present in an image, through increasingly complex visual algorithms, affording in-game photographers the ability to produce the higher resolution images needed for large scale printing, or alternatively allowing one to zoom into or blow up one detail of the image.

[49] High-dynamic range (HDR) is, loosely speaking, greater variance in luminosity values.

photographers to prioritize visual complexity over game performance, as they are seldom engaged in gameplay at the same time they are creating images). These versions also provide more "stand alone" tools that do not require the developer-implemented game hooks, allowing players to use Ansel in a wider range of games.

While early versions echoed more of a "snapshot" feature set and interface, as Ansel has evolved it has incorporated increasingly sophisticated image processing tools drawn from professional image editing software. These additions include a broad range of image filters, image adjustments like brightness, contrast and vibrance, and special effects like sketch aesthetics, colour enhancement, and vignetting (although what is and isn't present in the interface depends also on what game effects are used in game, and what the developer has enabled). Recent versions of the application also include composition assistance tools such as the "grid of thirds" that can be enabled by in-game photographers in the interface. NVIDIA has launched its own online gallery (*Shot with GeForce*) offering a preferred destination for these images, complete with an Instagram-style upvoting system.

The evolving Ansel feature set shows us several things. It draws from the precedent provided by hacking practices to allow more access to more control over image-making. This control is not exclusively bound to non-game photographic practices, although it does have links to photographic capture (lens simulations, depth of field control) and editing toolsets (like higher dynamic range or RAW output formats). It is also not bound to more realistic representation of actual, in-play game envi-



Fig. 2: Ansel interface, circa 2016.

ronments. In these images, interface elements are commonly removed (an element I have argued in earlier work is meant to better align the image to the look of a photograph as opposed to a screen capture,[50] and Ansel typically pauses gameplay (continuous gameplay remains a developer-side option that can be enabled), to allow for more control over the framing and staging of the in-game photograph. The enhancement, manipulation, and sometimes construction of visual information gives the in-game photographer significant agency in determining how the image looks, while still working within the constraints of a particular game. As a result, a valid Ansel photograph isn't necessarily one that a game player could even encounter within the possibility space of the average played game. And in fact, some backlash in the gamer community as to the accuracy and ethics of these images has arisen, particularly when in-game images that could not possibly occur within the gameplay of a released game are used to market particular games. Is a more true image one that represents an idealized version of the game, as close to in-engine as possible and on an optimal system; or the game as built and distributed? Within technical image discourses that commonly make actuality claims, Ansel's actuality is not found in showing the game as it *does* look, but as it *can* look.

Taking and making a photography: NVIDIA's Ansel discourse

You don't take a photograph, you make it.

Ansel Adams[51]

The following section, structured largely as a frame analysis, looks to make-visible the discursive strategies employed in NVIDIA's positioning of Ansel within the context of in-game capture, as well as the larger implications of this active and passive framing. Frame analysis[52] has been used within discourse and rhetoric methodologies as a means of articulating the use of relational containers, or frames, in constructing meaning. Jim Kuypers notes that framing "is a process whereby communicators, consciously or unconsciously, act to construct a point of view

[50] Cindy Poremba: "Point and Shoot: Remediating Photography in Gamespace", in: *Games and Culture* 2/1 (2007), pp. 49–58, here p. 51.

[51] Mary Street Alinder: *Ansel Adams: A Biography*, New York 2014.

[52] Originating in a conceptual structure proposed by sociologist Erving Goffman (*Frame Analysis: An Essay on the Organization of Experience*, Boston 1986).

that encourages the facts of a given situation to be interpreted by others in a particular manner… Frames are often found within a narrative account of an issue or event, and are generally the central organizing idea."[53] This analysis looks at text and media documents primarily produced by NVIDIA (including its marketing team and representative agents) between the launch of Ansel in early 2016, through to the end of 2019.[54]

In the initial marketing surrounding Ansel's launch, Ansel is positioned in a very specific way, leaning heavily into the art of photography, in language not unfamiliar to amateur photography discourse. This introductory framing, taken from NVIDIA's official Ansel launch press release positions game photography as "*undeniably a new art form*," noting "*the very best screenshots from famous game photographers … are shown in exhibitions, printed and framed, and admired by millions of gamers online.*" Ansel users, too, may create, "*screenshots worthy of display in an art gallery.*" This practice is legitimized through reference to "*the tools and processes Dead End Thrills uses to create his stunning screenshots, which have in the past been printed and displayed at art exhibitions.*" Ansel users are called to start their game photography career, "*maybe even become the next professional game photographer.*" The intermingling of rhetoric surrounding art and professional game photography is prominent through the text, and serves to position not just the tool, but the practices it enables, in several key ways: this is a sophisticated tool for serious in-game photographers, who are themselves potentially influential artists in an emerging form.

NVIDIA continues to frame Ansel using several recurring themes: *artistry*, *freedom*, *professionalization*, and *status*. The early rhetoric positioning the photo platform wants to associate it with the practices of in-game photographer / snapshooters, as skilled *artists*. Ansel's announcement stresses in-game photography as a "*new art form*," in which players are charged with "*crafting a masterpiece*." The ability to control "*look, feel and mood*" is highlighted, offering creators control over affective qualities of the image associated with artistry. Socially, users are called to show "*your creativity, your humor, your sense of style*." Terms like "*unique,*" "*one of a kind*" and "*perfect*" continuously reappear through NVIDIA's Ansel framing. However the unique photographs taken by Ansel are

[53] Jim A. Kuypers: "Framing Analysis", in: Jim A. Kuypers (ed.): *Rhetorical Criticism: Perspectives in Action*, Lanham 2009, pp. 181–204.

[54] In the paragraphs to follow, text quoted in italics comes from the discourse samples referenced through https://www.nvidia.com/en-us, and / or published on YouTube by NVIDIA, including transcripts from relevant video texts, published between 2016 and 2019. It does not include secondary journalism or community discussion responding to this content.



Fig. 3: NVIDIA figurative image, Ansel launch.

not unique to players personally, for example memories or souvenirs from play (references to gameplay documentation occur just once in the sources reviewed, in a more recent piece), but unique as defined against officially distributed images like wallpapers. Likewise, perfect is not about a "perfect moment" (as the toolset does not commonly run in real-time), but a "perfect photo" as assessed by the presumed common standards of a photographic community: reinforced by similar dynamics as are apparent in amateur photography contexts, through gallery platforms like *Shot by GeForce*.

Another prominent theme is *freedom* – in relation to the user's ability to make or craft (compose, frame) a photo to capture. Early materials aim to set up a sharp contrast between the limitations of non-Ansel screen capture, going so far as to show an image contrasting a DSLR camera with a Print Scrn button (Figure 3) – suggesting Ansel will be in the camp of the former and not the latter. Players can escape these limitations and overcome these confines, to create images once impossible to frame and snap, of never-before-seen perspectives and viewpoints. They are gifted a "*powerful*" toolset (notably a non-tethered camera) enabling them to "*go wherever they want*" in pursuit of perfect images. This dynamic illustrates what Möring and Leino have identified as neo-liberal values under the guise of liberal values: play being "free" not in the service of greater creative expression and agency, so much as gaining power in the service of further skills development (through skills that are presumed to have value in some speculative future market).[55] In-game photographs potentially

[55] Sebastian Möring and Olli Leino: "Beyond Games as Political Education – Neo-Liberalism in the Contemporary Computer Game Form", in: *Journal of Gaming & Virtual Worlds* 8/2 (2016), pp. 145–161, here pp. 156–157.

present "an investment in the player's human capital,"[56] one that may provide future capital in the form of social status or income generation.

Reinforcing this thread is the theme of *professionalization* – the images produced through the platform are consistently referred to as "*professional-grade*," and early rhetoric evokes the "*professional game photographer*" as an aspirational career role. In-game photographers, particularly Duncan Harris,[57] are set up as stars in this supposed field – with not only successful careers, but work hanging on walls and galleries: "*shown in exhibitions, printed and framed, and admired by millions of gamers online*." The use and identification of Industrial Light & Magic's EXR format is another nod to the professional character of users' activity, an animation industry standard that in one video it's claimed "*photographers will know well*."[58] While Ansel is framed as accessible, easy to use, and an interface revision is described as "*more intuitive*," this intuition is on the part of photo professionals and / or knowledgeable amateurs, not necessarily everyday users or snapshooters. The emphasis placed on its super resolution features also figure into this professionalization theme, as it is implied that high resolution prints might find their way onto player, gallery or exhibition walls (i. e., be commercially valuable, either directly or obliquely through renown).

One last theme that emerges ties into the *status*-driven sociality of photography prominent in social media platforms (the structure Tifentale and Manovich relate to amateur competitive photography). As with most online photography platforms today, NVIDIA encourages users to share their images, "*wowing the world with stunningly composed screenshots*." NVIDIA runs and promotes its own *Shot with GeForce* online gallery, and runs Ansel photo competitions (for example, for CALL OF DUTY: MODERN WARFARE). Recent effect inclusions introduce common tools for photo-meme creation (green screen tools and image stickers) and letterbox filters (to reinforce a "movie-like" aesthetic), although it is significant, given their presence in generalized game culture, that these tools are relatively late inclusions to the Ansel toolset. Such vernacular affordances are not part of the particular photography Ansel is meant to construct.

[56] Ibid. p. 152.

[57] Although, again, Harris does not identify as an in-game photographer, but as a graphics professional and hobbyist "screenshotter."

[58] Why photographers would know an animation standard well is left open, and is perhaps beside the point – such discourse is meant to perform professionalization, rather than rest in a specific professional context.

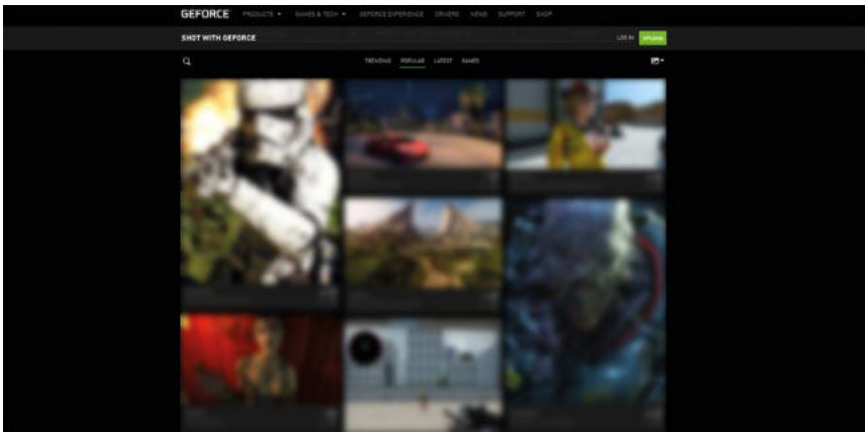


Fig. 4: Screenshot from the *Shot by GeForce* gallery (March 2021).

What makes an Ansel photograph?

There are no rules for good photographs, there are only good photographs.

Ansel Adams[59]

This next section presents a preliminary visual analysis of images created by users and shared in NVIDIA's official Ansel online photo gallery. This visual analysis is based on a small initial sample of the thirty (30) most upvoted images in the *Shot by GeForce* gallery in October 2019, using the upvoting system to identify which types of images are commonly validated within Ansel in-game photography. It presents a breakdown of which images are clearly genre defined, follow traditional composition rules, integrate "filters" and/or otherwise take on "photographic" signifiers. Coding for this generative analysis began with an initial scan of the images for recurring visual, genre and gender elements, iteratively refined through subsequent passes through the images.[60]

The most popular images also look the most indistinguishable from "regular" (albeit professional) photographs. Few obvious filters are used (while one image features vignetting, and a couple are in black and white, most avoid special effect filters). Colour enhancement and depth of field adjustments are readily recognizable in a majority of the images.

[59] Elizabeth T. Schoch: *Everything Digital Photography*, Avon 2001.
[60] Sonja K. Foss: *Rhetorical Criticism. Exploration and Practice*, Long Grove 2008.

Of the 30 images analyzed the most prominent compositional rule identified was the "rule of thirds" principle. Not only is this a commonly known composition "rule," but as identified earlier, Ansel allows players to place a grid that can guide them to adhere to this rule (or in some cases, perhaps to look it up). Shallow depth of focus is also heavily prominent in the gallery's top rated images – that "DSLR look" – despite access through Ansel to rendering tools that allow for deep focus. Only a few images (3 or 4 out of the set of 30) clearly demonstrate more sophisticated photographic composition approaches using, for example, rhythm and negative space, and few if any seek to challenge or subvert photographic tropes.

The dominant genre[61] for images (when evident) was portraits, followed closely by war / conflict journalism style images, professional images (fashion and product) and action images (for lack of a better descriptor, more "movie-like" in their depiction). A masculine tone dominates the gallery, with male subjects appearing sombre and determined, often shot from low angles (creating a sense of powerful or looming presence). In contrast, the most prominent configuration for female subjects is a sexualized "pinup" style. Images featuring women as subjects appear more colour enhanced, and present different angles (including low angle looking down, extreme angles and roll / dutch angle). In terms of a generalized aesthetic, dark colour palettes with high contrast lighting are pervasive, with war and vehicle imagery dominating subjects.

While this is a limited, exploratory survey, we can begin to see interconnections between the platform, the discursive framing presented by NVIDIA, and the in-game photographs most highly valued on the *Shot with GeForce* gallery. Platform affordances like freezing gameplay afford more constructed images (and image genres),[62] while the themes in Ansel supported games, and promoted by NVIDIA contests, also enhance the profile of particular styles and genres. Vernacular images (such as personal documentation) are a non-presence at the top of such an upvote system, and downplayed in Ansel discourse. Gendering plays a role in the preferred aesthetic, display of subjects, and the determining of acceptable image creation practices. The dismissal of capturing-the-moment prac-

[61] While genre markers are of course entangled with the genres of the Ansel-enabled games and are undoubtedly suggested by genre aesthetics and character representations in the games themselves, they are by no means determinate of them, particularly given the Ansel feature set.

[62] While Ansel typically freezes gameplay to allow for better control over image composition, there are some notable exceptions featured in the gallery – images that clearly depict some element of functional dynamic gameplay such as character movement. These images present opportunities for an increased display of techno-mastery, as they showcase the superior skill of the creators with their toolset.

tices highlights a reversal of the idea of a photograph holding life still (instead, life is made still so that the photographer can better move within it), suggesting "in-game" may be a bit of a misnomer. Instead, Ansel is structured around photographing game worlds – and specifically qualities within these worlds that best speak to NVIDIA's products and markets.

New photographies

By intervening in this space with a particular platform, NVIDIA becomes a key agent in defining the shape of amateur in-game photography. Ansel is rhetorically implicated in the context of technical control and mastery that emerges in competitive photography; professional stature, perfection and fame. It is primarily integrated into worlds characterized by detail and emergence, as well as, of course, photo-realism; but also with particular, and commonly gendered, themes. Social photography is enabled through its built in toolset, affording competitive meta-games, and the *Shot with GeForce* gallery (including "Shot with Ansel" contests that run in association with the gallery), re-construct structures of competitive photography. Techno-affordances of the platform can prompt boundary-policing: are you a serious in-game photographer if you don't have free camera access, or you capture at screen resolution?

The affordances of toolsets like Ansel create boundaries of what can be produced, and tie into what photography looks like: for example, restrictions on glitch, contests promoting images in the style of war journalism, or coded-in compositional rules. While this is influenced by existing practices (drawn from Harris and others), it also attempts to network in its own entities that position it more clearly within amateur photography paradigms. By establishing a prominent platform for in-game photography, NVIDIA can play a significant role in co-constructing in-game photography practices, in ways which align with its own corporate interests, and in particular skew towards monetization potential, like the training of professional in-game photographers on Ansel, the centralization of user-generated content, the integration of its hardware into desired practices. Competitive photography practices align nicely with this agenda.

But there is also instability surrounding this emerging instance of photography. In various ways, it reveals a bridging of both screen capture and photography discourse (where an image can be sometimes a photograph and sometimes a screen capture); at other times, a blurring of professional, artist and amateur distinctions. Within its tangle, we find

re-materialized aesthetics, such as depth of field, and discarded entities like indexicality.[63] This is characteristic of a postmedia milieu where entities in photography's vast network are entangled into different relationships in different contexts. The interplay of this emerging prosumer toolset, and the reconstruction of elements of competitive photography, has only begun to play out in the ludic construction of amateur in-game photography. This work underlines the need to look at a phenomenon like in-game photography not solely as a holistic phenomenon, but in terms of specific instances of photography.

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[63] Indexicality is here defined as a causal relationship between sign and referent (Peirce, in James Jakob Liszka: *A General Introduction to the Semiotic of Charles Sanders Peirce*, Bloomington 1996). Indexicality underpins a great deal of photographic discourse through the mid to late 20th century, where the relationship between a camera and its subject has been commonly (and often problematically) framed as indexical. While arguably indexicality isn't entirely discarded in in-game photography, its role in grounding actuality claims between the photographic image and a "real" world is significantly transformed. Even taking games as real (albeit digital) worlds, I have argued the images in Ansel are more directly bound to the possibility space of game environments and engines, not playable games.

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The Edge of the World

Natalie Maximova

"The Edge of the World" exploring the "out of boundaries" landscape of the game Cyberpunk 2077. We are tempted to think that landscapes just go on and on indefinitely. But where does a landscape begin – and where does it end? Does the virtual landscape have a limit?

By pushing against invisible boundaries, discovering and documenting the rough edges of the game world and exposing the representational logics behind it, I am tempted to think that digital reality is a cultural artefact. The edges of virtual worlds, with their frustrations and their unexpected utility, come to seem less like the ends of the world than the ends of the known world.





How to Win at Photography – How Games Teach Us to See

Marco De Mutiis

> "How's the size? 900 pts! All right! It's very nice!"
> You have handed in your pictures for Professor Oak to review them.
> "What's the pose? It's rolling... 500 pts!"

You are playing Pokémon Snap.[1] It's a photography game. It simulates the act of photographic capture in a safari-like ride on an island populated by Pokémons running around in the wild.

Photography simulations are intriguing and bizarre media objects: they merge representation and game rules and they short-circuit image layer and algorithmic layer, surface and sub-face, semiotics and mechanics, vision and play.

> Espen Aarseth: "The semiotic layer of the Game Object is the part of the game that informs the player about the game world and the game state through visual, auditory, textual and sometimes haptic feedback. The mechanical layer of the game object (its *game mechanics*) is the engine that drives the game action, allows the players to make their moves, and changes the game state."[2]

These two layers, semiotics and mechanics, inform and influence the player in different ways. The politics of representation in games are easier to single out, as photorealistic CGI graphics tend to remediate the semiotics of photography, cinema and advertisement. Film and photography theory have long critiqued the problematic notion of the objectivity of images, pointing to the embedded cultural filters within visual culture and the way representation influences and programs the viewers. Game mechanics, on the other hand, are equally effective forces that work through an invisible layer of rules and limitations to shape player behavior, allowing and encouraging specific choices in order for players to win the game.

1 *Pokémon Snap* (1999), Nintendo, Nintendo 64.

2 Espen Aarseth: "Define Real, Moron! Some Remarks on Game Ontologies", in: Stephan Günzel, Michael Liebe and Dieter Mersch (ed.): *DIGAREC Keynote-Lectures 2009/10*, Potsdam 2011, pp. 50–69, https://publishup.uni-potsdam.de/opus4-ubp/frontdoor/deliver/index/docId/5044/file/digarec06_S050_069.pdf (last seen March 7, 2022).

> Katie Salen and Eric Zimmerman: "Game Play: the formalized, focused interaction that occurs when players follow the rules of a game in order to play it."[3]

Game mechanics restrict the player's freedom and structure play, reducing it to a set of predefined rules and discrete choices that are made available by the game software. The tension between play's freedom and submitting oneself to the constraints of gameplay is one of the pleasures of playing computer games. Is it about mastering the machine or being mastered by it?

> Seth Giddings and Helen Kennedy: "[…] 'mastery' is only one pleasure among many, […] activity and passivity are not opposites in videogame play but fluctuations in the circuit, and thus […] a new conceptual language is needed to attend to both the operations of nonhuman agency and the human pleasures of lack of agency, of being controlled, of being *acted upon*."[4]

If films facilitate the viewer's identification with key protagonists and let the spectator internalize social norms and filters through an aesthetic experience, game mechanics "program" the player through their possible scripted actions, actions that must be learned and performed. Until a certain machinic game state is satisfied by the player – that is, until a certain choice is made, a certain position is reached, a certain number of coins have been collected and / or an enemy is killed – the game does not progress and the player cannot move closer to her goal of winning.

It is possible for semiotics and game mechanics to go hand in hand, thereby reinforcing specific narratives. Players of Grand Theft Auto V (GTA V),[5] for example, move through the streets of Los Santos, the parodic version of late capitalist America that was rendered and simulated on top of "250,000 photographs and countless hours of video"[6] taken of Los Angeles. The representational layer of GTA V reinforces problematic views of gender and race, depicting marginalized groups in contemporary American society using photorealistic computer graphics. Homeless people live in tents in areas littered with garbage under flyovers;

[3] Katie Salen and Eric Zimmerman: *Rules of Play: Game Design Fundamentals*, Cambridge / Mass. 2003, p. 311.

[4] Seth Giddings and Helen W. Kennedy: "Little Jesuses and Fuck-off Robots: On Aesthetics, Cybernetics, and Not Being Very Good at Lego Star Wars", in: Melanie Swalwell and Jason Wilson (ed.): *The Pleasures of Computer Gaming: Essays on Cultural History, Theory and Aesthetics*, Jefferson / NC 2008, pp. 13–32.

[5] *Grand Theft Auto V* (2013), Rockstar, PlayStation 3.

[6] Phil Hoad: "From Watch Dogs to GTA V, why 'video games are going to reshape our cities'", in: *The Guardian Online*, June 10, 2014, https://www.theguardian.com/cities/2014/jun/10/watch-dogs-gtav-video-games-reshape-cities-sim-city-will-wright (last seen March 7, 2022).

transgender individuals exist solely as sex workers outside of nightclubs; and people of color in Los Santos generally fulfill "gangster" stereotypes.

This layer is coupled with game mechanics that reinforce the biased representations contained in GTA V. Homeless people have no role in gameplay; they serve no purpose in the main story line and the only interaction possible is for the player to physically attack them. The transgender sex workers can only "be heralded with disgustingly transphobic lines such as 'Hello, sir. I mean, madam.'"[7] Black characters are more skilled at stealing cars and more likely to take out their guns if provoked by the players.

> Steffen Krüger: "Franklin will use his carjacking skills, unlocking the door elegantly and discreetly with a hook. Strikingly, of the game's three main playable characters [...], only Franklin has such 'street skills' and, by virtue of this exclusivity, these skills are offered by the game as quasi-natural racial proclivities. Secondly, it is not advisable to bump into or provoke a member of one of the racialised minorities represented in the game that populate the poorer areas of Los Santos. The chances are, it will get the avatar killed, with armed men appearing from everywhere around, attacking without further warning. Again, the algorithmic inevitability of such a pattern results in a supposedly natural state of affairs in which racialized minorities are shown to be inevitably and naturally inclined to raw, unmitigated violence."[8]

On the other hand, it is possible for representation and algorithmic mechanics to be disjointed, indifferent to one another, with the aesthetic experience acting more like a decorative distraction from the core of gameplay and its rules.

> McKenzie Wark: "Original Sims can be any mix of two genders and three colors. In *The Sims 2* you start with preset templates (Caucasian, African American, Chinese, Persian – and Elf) alterable via a lot of sub-sliders. You choose gender, age, color, hair style and color, eye color, weight, height, glasses, hats, accessories, clothes, and so on, but these external attributes are merely a skin. They do not really affect the game. The sliding variables of character, however, do program in advance what careers a Sim can excel at, and which past times restore faculties. In Sims 2, they may be straight or gay. Again, it makes no difference. [...] The external representations are of no account; the internal variables determine potential. The 'skin' is arbitrary, a difference without a distinction, mere decoration. Underneath it lies a code which is all."[9]

7 Mitch Alexander: "Grand Theft Auto V: Misogyny & Transphobia", in: *GayGamer.Net*, October 3, 2013, https://web.archive.org/web/20150503041212/http://gaygamer.net/2013/10/grand-theft-auto-v-misogyny-transphobia/ (last seen: June 29, 2022).

8 Steffen Krüger: "Facing Fanon: Examining Neocolonial Aspects in Grand Theft Auto V through the Prism of the Machinima Film Finding Fanon II", in: *Open Library of Humanities* 4/1: 12 (2018), pp. 1–31, http://doi.org/10.16995/olh.177 (last seen: March 7, 2022).

9 McKenzie Wark: *Gamer Theory*, Cambridge / Mass. 2007, p. 28.

Back to photography games. Back to Pokémon Snap. Back to Professor Oak's review:

> "How's the size? 340 pts! Hmm... It's so-so."
> Photography is gamified, it must be performed by the player, it must follow the rules of the game.
> "How's the Pose? 750 pts! Hmm... It's so-so."
> Professor Oak stands in his lab judging your pictures, giving points and scoring technique, size and pose.
> "How's the technique? Wait... Your Pokémon isn't in the middle of the frame. It would have been perfect if the Pokémon were in the middle of the frame."
> You are not only consuming a representation system, you are taught to perform it.
> "Oh, dear... your last shot was better than this."

As you master the game, obtaining high scores for your images, you are trained by its narrow and strict code of what can be accepted as good photography. Look again at Prof. Oak: he wears a lab coat and stands in his laboratory filled with machines. He is a scientist doing a portfolio review, which is the perfect visualization of algorithms applied to an aesthetic analysis of photographs.

> Cindy Poremba: "Photography is an inherently gamelike practice."[10]

Yet to *win* at photography means to adhere to a specific visual regime, and to be unable to conceive images that allow no ambiguity. There are clear rules that separate successful and unsuccessful images. Photography is reduced to only one acceptable representation system – one that players have no choice but to subscribe to.

> Alexandra Orlando and Betsy Brey: "The fact that *Snap* gamifies basic photography skills and teaches its players how to create a single kind of photographic image indicates a single acceptable or desirable kind of photography. Not only does it teach just one style, but it also discourages learning others in the game space. This can be viewed as a kind of photographic colonialism – the limitation to a single viewpoint at the expense and extinction of others by a controlling power outside of the immediate environment."[11]

It's all fun when confined to Huizinga's "magic circle" of play, but the gamification of photography is a phenomenon that has been spreading beyond computer games, for example, to shape the rules of representation of social exchange on online media platforms. Within the currency

[10] Cindy Poremba: "Point and Shoot: Remediating Photography in Gamespace", in: *Games and Culture* 2/1 (2007), pp. 49–58, here p. 53, https://doi.org/10.1177/1555412006295397.

[11] Alexandra Orlando and Betsey Brey: "Press A to Shoot: Pokémon Snap-shots and Gameship Ownership", in: *First Person Scholar*, 2015, http://www.firstpersonscholar.com/press-a-to-shoot/ (last seen March 7, 2022).

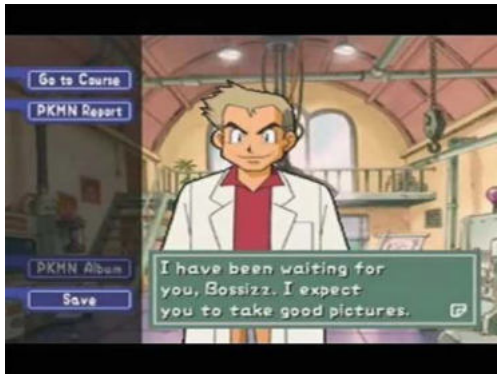


Fig. 1: Screenshot from *Pokemon Snap – Prof. Oak Sucks! – part 3 (1 of 2)* by Connor Kelly, published on April 13, 2012, https://www.youtube.com/watch?v=uPyjnxfzEFA, (last seen March 7, 2022).

of likes and followers in the so-called attention economy, the version of photography that is most effective is the one that produces what Jonathan Beller calls "fractal celebrity."[12] This idea of computational representation flattens diversity and promotes gender inequality, racism and cultural codifications by means of a restrictive notion of what constitutes successful photography.

"14 tips for amazing Instagram photographs,"[13] "How to Take Good Instagram Photos: A Step-by-Step Guide,"[14] "How to Take Better Instagram Photos: 13 Steps (with Pictures)."[15]

While the genre of photography simulation games remains a niche compared to the dominant titles of FPS and car racing games, their mechanics are directly transferable from the interface of the game camera to that of a DSLR. Because of the gamelike qualities of photography itself, the relation between gamified and traditional photographic capture is arguably closer than that between shooting a gun and playing an FPS.

[12] Jonathan Beller: "Informatic Labor in the Age of Computational Capital", in: *Lateral* 5/1 (2016), https://doi.org/10.25158/L5.1.4 (last seen March 7, 2022).

[13] "14 tips for amazing Instagram photographs", in: *BT*, September 15, 2018, https://web.archive.org/web/20200812185745/https://home.bt.com/tech-gadgets/internet/social-media/14-tips-for-amazing-instagram-photographs-11363985667611 (last seen: June 29, 2022).

[14] Michelle Cyca: "How to Take Good Instagram Photos on Your Phone: A Step-by-Step Guide", in: *Hootsuite*, September 12, 2018, https://blog.hootsuite.com/how-to-take-good-instagram-photos/ (last seen March 7, 2022).

[15] wikiHow Staff: "How to Take Better Instagram Photos", in: *wikiHow*, 2018, https://www.wikihow.com/Take-Better-Instagram-Photos (last seen March 7, 2022).



Fig. 2: Nathan @hintofsarcasm on Twitter, August 31, 2018, https://twitter.com/hintofsarcasm/status/1035436949727784960?lang=en (last seen: March 7, 2022).

In other words, Professor Oak is your photography teacher even after you're done playing.

> Tony Yoates: "At the end of every level [Professor Oak] judges all the pictures you took, only keeping the best ones for his journal. As a little kid, this also taught me the basics of taking photographic evidence."[16]

Pokémon Snap is one of many photography games, or – to be more specific – photography safari games. You are now a wildlife photographer in the fictional Manyanga Conservation Area in East Africa. The game is Afrika.[17] You have at your disposal a number of cameras and lenses, all faithful and licensed simulations of the Sony Alpha camera series. Your clients send you tasks.

> *>Subject: Another photo request just came in*
> *>From: Research Project Head Office*
> *>The Masai Giraffe photo you sent us the other day was quite nice. You're already creating a buzz around the office. When we showed the photo to a bottled water manufacturer, they expressed an interest in seeing a photo of a giraffe drinking water. Can you manage this additional request?*
> *Manyanga Research Project*

After taking and submitting your pictures, you get client evaluation reports:

16 Tony Yotes: "Gushing About: Pokemon Snap", in: *Yote Games*, December 11, 2013, http://www.yotesgames.com/2013/12/gushing-about-pokemon-snap.html (last seen: March 7, 2022).

17 *Afrika* (2008), Rhino Studios, Sony Computer Entertainment.

>*Angle: Excellent*
>*Target: Marvelous*
>*Distance: Great*
>*Technique: Great*

Photography safaris are a special kind of photographic activity. The photographer hunts a prey, the camera sublimates the gun. The subject of the image is unaware of the activity and possibly unwilling to be portrayed.

> Susan Sontag: "One situation where people are switching from bullets to film is the photographic safari that is replacing the gun safari in East Africa. The hunters have Hasselblads instead of Winchesters; instead of looking through a telescopic sight to aim a rifle, they look through a viewfinder to frame a picture."[18]

In Safari Guns[19] you are armed with a camera and a rifle. You are supposed to shoot pictures of animals and shoot bullets at poachers. From the point of view of gameplay it adds a layer of difficulty, forcing you to match the right weapon to the correct target; and yet the relationship between photographer and photographed subject mirrors exactly the one between gunman and gun victim. Photography safari games not only inherit the asymmetric power relations between photographer and subject, they also reinforce them through their mechanics and scoring systems, leaving the machinic subjects limited or no choice at all in terms of the ability to escape photographic capture. It's an act of dominance through visuality, in a hierarchy where the human sits on top and simulated animals wait to be captured through the simulated lens.

> Paul Virilio: "[...] alongside the 'war machine' there has always existed an ocular (and later optical and electro-optical) 'watching machine' capable of providing soldiers, and particularly commanders, with a visual perspective on the military action under way. From the original watch-tower through the anchored balloon to the reconnaissance aircraft and remote-sensing satellites, one and the same function has been indefinitely repeated, the eye's function being the function of a weapon."[20]

Pokémon Snap, Afrika, Safari Guns, Wild Earth[21], Snapimals[22]; all of these games build upon a one-sided idea of photography, whereby whatever is in front of the lens is mere background, with no voice in the photographic process. They reward the capture of the subjects, as if

[18] Susan Sontag: *On Photography*, New York 1977, p. 11.
[19] *Safari Guns* (1989), Infogrames Europe SA, Atari.
[20] Paul Virilio: *War and Cinema: The Logistics of Perception*, New York City, New York 1989, p. 4.
[21] *Wild Earth* (2006), Ubisoft, Majesco Entertainment, Microsoft Windows.
[22] *Snapimals* (2015), BebopBee, Android.

they were just another item in their inventory, an achievement trophy. It's a unilateral relationship in which the photographer dominates her prey through visual media, rather than a space of relations among its stakeholders.

> Ariella Azoulay: "The assumption is that the photographs show or perform something that is already over and done, foreclosing the option of seeing photography as a space of political relations. In the political space that is reconstructed through the civil contract, photographed persons are participant citizens."[23]

It gets worse. In front of you now stands a female model in a swimming suit, posing next to a pool. You are playing Paparazzi[24]. While not technically a safari, rather more of a photoshoot simulation game, Paparazzi promotes an extended safari gaze. Its game mechanics are similar to those of Afrika and Pokémon Snap. It simply swaps the textures and skeletons of the wild animals with that of the subservient female object of desire – including what seems to be a ridiculously exaggerated gravity force that affects the model's bouncing breasts only. The photographed subjects remain trapped in this violent act of dominance, the gaze of the white male (the prototypical game player of what is known in the industry as the "Hard Core"[25]) gamified and quantified. In fact, the model in Paparazzi enjoys even less freedom than the elephant in Afrika, as she is unable to leave the room or to attack the photographer and evade the camera's gaze.

Finder Love: Aki Hoshino[26] even has a "tension bar", guiding the player to take the "correct shot," capturing the most sensual and intimate poses of the female model, which unfolds in a prerecorded video sequence.

> "Shutter Chance!," "Good," "Tension MAX."

Once again, there is no other choice but to subscribe to a sexist representation. "None of the above" is not an option and the only resistance possible is Game Over.

Digital, networked and computational processes have reorganized signs and semiotics, quantifying forms of representation and reducing them to a binary model. Professor Oak stands as the "allegorithm" (McKenzie Wark) of the current networked image system, encouraging

[23] Ariella Azoulay: *The Civil Contract of Photography*, New York 2008, p. 19.
[24] *Paparazzi* (2004), D3Publisher, PlayStation 2.
[25] Nick Dyer-Witheford and Greig de Peuter: *Games of Empire: Global Capitalism and Video Games*, Minneapolis 2009, p. 80.
[26] *Finder Love: Aki Hoshino* (2006), Capcom Co., PlayStation Portable.

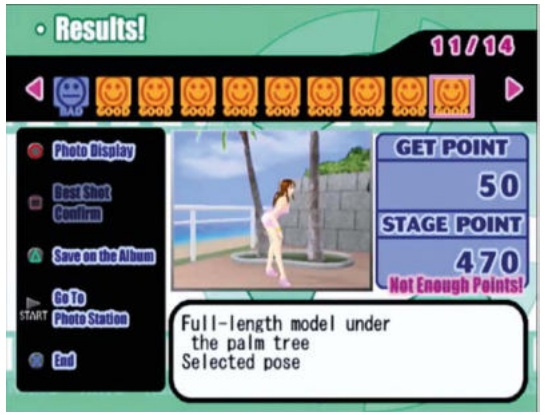


Fig. 3: Screenshot of Paparazzi (PS2) Gameplay by Pete Davison. Published on February 10, 2008, https://www.youtube.com/watch?v=uD1MpTZe960 (last seen: March 7, 2022).

and rewarding photography that offers a spectacle to be consumed, its subjects to be conveniently boxed into clear categories with no agency.

This image system also follows a problematic tradition in photography which assumes the objectivity of reproduction and the role of the photographer as the sole agent in the scene portrayed. Scores are turned into numbers and points, revealing the often tacit and hidden rules of such representation and effectively training players to conform to a view that keeps reinforcing the creation and consumption of images of inequality, in a society that has commodified images and turned the photographic attention into a currency.

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The Conditional Cyberimage – On the Role of Gameplay in Artistic In-Game Photography

Sebastian Möring

Introduction



Fig. 1: *The End of the Virtual World*, Robert Overweg, 2010.



Fig. 2: *The End of the Virtual World*, Robert Overweg, 2010.

What you see here are two pictures from a series of images showing abandoned rural and urban landscapes with roads that appear to terminate abruptly, whether at the horizon (Fig. 1[1]) or in some end-of-world space (Fig. 2[2]). Of course, it goes without saying that a horizon does not necessarily mark the end of a world; it merely indicates the limit of the view and the range of vision. In the case of Fig. 1, the horizon not only limits the range of vision, it also marks the limit of action in the world depicted in the picture. Fig. 2 seems to take the opposite point of view; in this case, the observer is looking at an urban landscape from a position within the end of a world, that is, from the viewpoint of an assumed horizon. Beyond the horizon or the end of the world there seems to be nothing, a void that is not meant to be seen. For this reason, places like these are normally well hidden behind architecture and / or other geological and marine landscape features, such as mountains, oceans, etc. The pictures I am describing here are photographs of computer game worlds taken by the artist Robert Overweg. For his series titled *The End of the Virtual World* from 2010, Overweg literally leaves the beaten tracks of popular computer games, such as Left 4 Dead 2, Half-Life 2, Counter-Strike: Source, and Call of Duty: Modern Warfare 2.[3] Instead of following the dictates of these games, he takes their player-figures[4] for a walk to probe the limits of their maps. In a statement on his work for this series, Overweg notes that by removing the photographs from the context of their virtual world, "the typical aesthetics of games are laid bare".[5] Austrian journalist Rainer Sigl outlines the method behind this dissection, calling the work of Overweg and others "the art of in-game photography".[6]

While scholarly interest in the subject of in-game photography is growing,[7] analyses of the specific aesthetics of in-game photographs are

1 Robert Overweg: "The End of the Virtual World", in: *Shot by Robert – Photographer in the Virtual World*, 2010, http://www.shotbyrobert.com/?page_id=102 (last seen: November 29, 2021).

2 Ibid.

3 *Half-Life 2* (2004), Valve; Sierra, Microsoft Windows; *Left 4 Dead 2* (2009), Valve, Microsoft Windows; Counter-Strike: Source (2004), Valve, Microsoft Windows; *Call of Duty: Modern Warfare 2* (2009), Xbox 360, Activision.

4 Daniel Vella: "The Ludic Subject and the Ludic Self: Analyzing the 'I-in-the-Gameworld'", PhD Thesis, Copenhagen 2015.

5 Robert Overweg: "The End of the Virtual World", op. cit.

6 Rainer Sigl: "The Art of in-game Photography", in: *videogametourism.at*, July 25, 2012, http://videogametourism.at/content/art-game-photography (last seen: August 1, 2021).

7 Cindy Poremba: "Point and Shoot: Remediating Photography in Gamespace," in: *Games and Culture* 2/1 (2007), pp. 49–58; Matteo Bittanti: "The Art of Screenshoot-Ing: Joshua Taylor, Videogame Photographer", in: *Mister Bit – Wired IT*, December 24, 2011. http://blog.wired.it/misterbit/2011/12/24/the-art-of-screenshoot-ing-joshua-taylor-video-

still rare. Similarly, analyses of individual artistic in-game photography projects as well as of the larger technological-cultural context of in-game photography have been few and far between.

I believe that Overweg's work is especially well-suited to reflecting on the conditions of possibility of in-game photography. On the level of content, the photographs described above depict an essential aspect of their source game's[8] structure, which in my view is crucial to understanding the specific aesthetics of in-game photography. I thus hypothesize that Overweg's photos – in showing the limits of the game's structure and its gameplay condition – thus reveal the dependence of in-game photography on the respective source game as conditional *cyberimage*. For this reason, Overweg's artistic in-game photographs are paradox objects: They are images that are based on the conditional *cyberimage* of the computer game, which itself is absent from the resulting picture, namely the in-game photograph. The gameplay condition of the computer game is crucial, however, in the process of taking a photograph. Yet it is potentially absent from the resulting picture that nevertheless often contains traces of it. In this sense, Overweg's in-game photographs can be considered to be part of the genre of media-reflexive artistic in-game photography and as images of second-order, as described by Birgit Schneider in this volume.

To develop this hypothesis, I suggest looking into the discourses of game art and game studies from the perspective of visual culture (Bildwissenschaft). My ultimate goal is to better understand how the relation

game-photographer.html (last seen: August 1, 2021); Rainer Sigl: "The Art of in-game Photography", op. cit.; Eron Rauch: "Virtual Light: Exploring In-Game Photography And Photo History", in: *videogametourism.at*, August 28, 2012, http://videogametourism.at/content/virtual-light-exploring-game-photography-and-photo-history (last seen: August 1, 2021); Seth Giddings: "Drawing without Light", in: Martin Lister (ed.): *The Photographic Image in Digital Culture*, Abingdon, Oxon 2013, pp. 41–55; Christopher Moore: "Screenshots as Virtual Photography: Cybernetics, Remediation, and Affect", in: Katherine Bode and Paul Longley Arthur (ed.): *Advancing Digital Humanities: Research, Methods, Theories*, Hampshire, New York 2014, pp. 141–60; Winfried Gerling: "Photography in the Digital", in: *Photographies* 11/2–3 (2018), pp. 149–67; Sebastian Möring and Marco de Mutiis: "Camera Ludica: Reflections on Photography in Video Games", in: Michael Fuchs and Jeff Thoss (ed.): *Intermedia Games – Games Inter Media: Video Games and Intermediality*, New York 2019, pp. 69–94; Vladimir Rizov: "PlayStation Photography: Towards an Understanding of Video Game Photography", in: Marc Bonner (ed.): *Game | World | Architectonics: Transdisciplinary Approaches on Structures and Mechanics, Levels and Spaces, Aesthetics and Perception*, Heidelberg 2020, pp. 49–62; Jan Švelch: "Redefining Screenshots: Toward Critical Literacy of Screen Capture Practices", in: *Convergence: The International Journal of Research into New Media Technologies*, September 2020, pp. 1–16.

8 With the term "source game" I am referring to the game providing the image content of an in-game photograph.

between the resulting image and the distinguishing qualities of computer games (e. g., gameplay[9]) is conceptualized.

The game art discourse: games as material for in-game photography and the essential contradiction of works of game art

Due to the absence of any established scholarly discourse on artistic in-game photography, the topic was initially covered mostly in the context of game art and digital media art in less formalized publications, such as the blog *GameScenes* (gamescenes.org) run by game scholar, curator and artist Matteo Bittanti. Texts exploring the logics of game art thus offer a promising starting point for understanding the relation between a photograph resulting from artistic in-game photography and its source game. In the following I will show that analyses of the essential characteristics of game art often revolve around the relation between computer games and computer game art. They focus specifically on the interactive characteristics and the visual surface of computer games.

In his definition of game art, Bittanti suggests the following:

> Game Art is any art in which digital games played a significant role in the creation, production, and / or display of the artwork. The resulting artwork can exist as a game, painting, photograph, sound, animation, video, performance or gallery installation.[10]

If we adapt this definition of game art to in-game photography, the latter can be described as a form of game art in which the source game functions as material for the resulting photograph. Besides photography, game art can appear in any kind of medium – even in the form of another computer game (e. g., as a meta game[11]). Although Bittanti refers to the photograph as a potential medium of game art, he does not specify how the resulting photograph is produced. And, indeed, there are different methods: taking a screenshot, using the photo mode of a game, or photographing the computer screen with a digital or analog photo camera.

[9] The term "gameplay" roughly describes the limitations and affordances of player action offered by a given computer game which a player is subjected to when playing a given game.

[10] Matteo Bittanti: "Game Art. (This Is Not) A Manifesto. (This Is) A Disclaimer", in: Matteo Bittanti and Domenico Quaranta (ed.): *Gamescenes: Art in the Age of Videogames*, Milano 2006, pp. 7–14, here p. 9.

[11] See Stephanie Boluk and Patrick LeMieux: *Metagaming: Playing, Competing, Spectating, Cheating, Trading, Making, and Breaking Videogames*, Minneapolis 2017.

According to Paul Frosh, "a screenshot is created by extracting the information from a computer or mobile device's 'frame buffer' [...] along with instructions to the device to interpret this information as an image file format like JPEG".[12] For his part, Winfried Gerling regards screenshots as a kind of screen image.[13] According to Gerling, screen images can be produced by means "internal" to computer systems, such as the screenshot functions and integrated photo modes of computer games. Internal screen images correspond to Frosh's idea of "storing" the data of that which can be seen on screen at any given moment of running a computer program and / or operating system.[14] Screen images can also be taken by means that are external to computer systems, such as digital or analog cameras.[15] The latter would correspond to the notion of screen image photography. Artistic in-game photography, however, can be based on both methods, that is, on internal and external screen images depending on the preference of the artist.

With this in mind, Bittanti's definition inspires a working definition of artistic in-game photography as a screen image that makes use of the imagery of computer games, that is created with artistic intent, and that is displayed on a screen or a printed surface. While this definition captures some aspects of artistic in-game photography, it does not describe the relation between computer games and in-game photographs any closer than to refer to its imagery as the source material for the resulting work of art.

The media scholar Alexander Galloway addresses the relation between an in-game photograph and its source computer game by describing it as a paradox of absence and presence. For Galloway, the gameplay of the computer game is absent, while a part of the aesthetical layer of the game is still present. In his chapter "Countergaming", he points to an "essential contradiction" of works of game art, namely "that they have sought largely to remove their own gameplay and lapse back to other media entirely (animation, video, painting)".[16]

One example of this essential contradiction is certainly machinima, a genre consisting mainly of narrative and experimental films made from computer games.[17] If a game is transformed into a film, the gameness

[12] Paul Frosh: *The Poetics of Digital Media*, Cambridge / UK, Medford 2019.
[13] Winfried Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit, p. 150.
[14] Ibid.
[15] Ibid., see also Julia Eckel in this volume.
[16] Alexander Galloway: *Gaming: Essays on Algorithmic Culture*, Minneapolis 2006, p. 126.
[17] See Henry Lowood: "High-Performance Play: The Making of Machinima", in: *Journal of Media Practice* 7/1 (2006), pp. 25–42; Henry Lowood and Michael Nitsche (ed.): *The Machinima Reader*, Cambridge / Mass. 2011.

or "gameplay" ceases to exist. In other words, "the game loses its rule set completely and ceases to be a game after all".[18] Although Galloway does not mention it specifically, this is true of in-game photographs as well. As soon as in-game photographs are taken, they usually leave the context of their source game and can no longer be interacted with in the same way as with the game itself. In an in-game photograph, the game is present merely to the extent that its visual layer becomes the content of a still image. In other words, the computer game is reduced to a static image, and this static image is different from the playable or navigable image of a computer game.[19]

This observation is remarkable given that computer game scholars have gone to great lengths to highlight the specific differences between so-called non-ergodic media, such as literature and cinema, and ergodic media, such as computer games.[20] They emphasize the mechanics of computer games over their semiotic layer, which consists of their visual, aural, or haptic output.[21] As I noted above, Galloway holds that once computer games become artistic material, their unique characteristic (their gameplay, that is, their ergodicity) paradoxically disappears, at which point they are transformed into non-ergodic or non-playable media. Whereas the art of machinima makes the computer game lapse back to the moving image, in-game photography goes even further and makes it lapse back to static images. To be sure, computer games generally contain static and moving images, too. Yet Galloway emphasizes the

[18] Alexander Galloway: *Gaming: Essays on Algorithmic Culture*, op. cit., p. 107.

[19] There are four different ways this static image is technically realized: 1) The static image can be the result of using the photo mode of a game which, when activated, commonly halts the game and allows players to move their figure through a frozen game world like in Doom (id Software 2016) photo mode, 2) The static image can be produced by using a photography simulation implemented in the game. The gameplay action is usually not halted when activating the simulated photo camera, but it is halted in the resulting static image. 3) The static image can be the result of using the screenshot function of the platform the game is played on (e. g. using the "Print Screen" button on a PC or the "share" button on the PlayStation 4 controller, see also Frosh 2019). This is most commonly used in games which neither feature a photography simulation nor a photo mode. 4) The static image can be created by placing an analog or digital photo camera in front of the screen on which a game is being played (see also Gerling 2018). The first two ways are usually implemented in games. The third and fourth option are used when the first two options are missing in a game the user wants to photograph. Although these strategies are quite different, for this article I regard all of them as in-game photography since my focus lies on the image of the computer game as the condition of possibility of each of these strategies.

[20] Espen Aarseth: *Cybertext. Perspectives on Ergodic Literature*, Baltimore 1997; Gordon Calleja: *In-Game. From Immersion to Incorporation*, Cambridge / Mass. 2011.

[21] Espen Aarseth: "Define Real, Moron! Some Remarks on Game Ontologies", in: Stephan Günzel, Michael Liebe and Dieter Mersch (ed.): *DIGAREC Keynote-Lectures 2009/10*, Potsdam 2011, pp. 50–69.

fact that in the form of game art, the content of these images no longer depends on the performance of a player but merely becomes the object of a viewer's gaze. In the following, I intend to show that this process of becoming an object of a viewer's gaze implies a detachment of the image from the game.

Among the different categories of game art proposed by Galloway, artistic in-game photography may be an extreme case of the category "gameplay versus aestheticism".[22] In works of this category, "any conventional sense of gameplay is obscured. The game engine persists (albeit often stripped down and dissected to near death)" and "aesthetic experimentation often trumps interactive gameplay".[23] As in-game photography was not a very prominent genre at the time, this category was developed mainly with works of machinima and similar artworks in mind, such as *Super Mario Clouds* by Cory Arcangel.[24] For this work, the artist used "an old Mario Brothers cartridge which I modified to erase everything but the clouds".[25] As a result, all that is left to see are the skies and clouds of Super Mario Bros.[26] moving meditatively across the screen from right to left. Just like Arcangel's *Super Mario Clouds*, works of machinima can also be the result of a persisting game engine that is required to display the moving images of the works but that does not allow for any player interaction (gameplay) with the source game. Other such works are transformed into video files that then exist detached from their source game (engine). In-game photographs that are distributed as image files or as physical prints on photo paper present extreme cases of this category. A detachment from the game is characteristic of in-game photographs: There can only be traces of the gameplay or the game engine left, and these only to the extent that they are literally transformed into visible form (e. g. visible effects of glitches), since in-game photography emphasizes the visual layer of the source game. This applies to in-game photographs taken as screenshots using the implemented photo mode as well as to in-game photos taken by capturing the screen with an analog or a digital camera while playing the game. Nonetheless, the former describes a material detachment from the game at the end of the in-game photographic pro-

22 Alexander Galloway: *Gaming: Essays on Algorithmic Culture*, op. cit., p. 118.
23 Ibid.
24 *Super Mario Clouds* (2002), Cory Arcangel.
25 Cory Arcangel: "Super Mario Clouds", in: *Cory Arcangel's Official Portfolio Website and Portal*, no date, https://coryarcangel.com/things-i-made/2002-001-super-mario-clouds (last seen: August 1, 2021).
26 *Super Mario Bros*. (1985), Nintendo, Nintendo Entertainment System.

cess, while the latter describes a material detachment which is integral to the initial setup of an in-game photographic process.

Seeing in-game photographs as cases of game art, both Bittanti and Galloway suggest a detachment of the resulting picture from the gameplay of computer games. This perspective allows us to understand the relation between the result of the in-game photographic process (the in-game photograph) and the computer game. However, in my view, the characteristic gesture of detachment for the case of in-game photography is not yet satisfyingly described by the observations presented above. The game art discourse omits the significance of the gameplay process involved in many in-game photographic strategies. I believe, though, that the way a game is played is inscribed in the making of in-game photographs. To substantiate this hypothesis, it is necessary to shed more light on the role of the gameplay in the process of in-game photography. I therefore propose to look at game research from the perspective of visual culture. In particular, I will examine a branch of game studies which emphasizes an understanding of computer games from the perspective of their image. Some of them even consider games to be specific kinds of images, namely interactive images. Looking into this discourse will help to understand what kind of images in-game photographs derive from.

Game studies' emphasis on the image

In-game photography is a *derivative* form of art. It is highly dependent on another form of art, which can be referred to more or less as computer game design. Indeed, without the creative and manual labor of game designers, landscape designers, character modelers, animators etc., as well as without the computational power of game engines, there would be little appeal to taking screenshots or photographs in computer games. Most artistic in-game photography is not taken in two-dimensional game environments like Super Mario Bros. but rather in 3D computer games featuring picturesque, detailed, and often highly plausibly simulated worlds which are navigated and observed from a first-person or a third-person perspective. For example, Alan Butler's work *Down and Out in Los Santos*[27] investigates the subject of homelessness in Los Santos, a simulated version of Los Angeles, by means of in-game photography. The setting for the Los Santos project originates from the fifth iteration

[27] Alan Butler: *Down and Out in Los Santos*, 2016 – today, http://downandout.in-los-santos.com (last seen: August 1, 2021).

of the world-famous computer game series Grand Theft Auto.[28] His photographs from the series "Down and Out in Los Santos" reveal an artistic character that is partially derived from the *visual design* of the game, that is, from the lighting, the plausible outer appearance of the homeless, the vividness of the city but also its dirtiness, etc. Butler could not have taken his in-game photographs, however, had it not been for the roughly 1,000-person team of game designers and developers of different kinds[29] who designed not only a *photorealistic* but also a *socio-realistic* world, which makes such photography projects possible. This was the argument presented by Marco De Mutiis in reference to Alexander Galloway at the *Photomedia* conference in Helsinki in March 2018. It is designed to spotlight the fact that there is a lot of craftsmanship or techné required *before* in-game photographical projects can emerge. These elements all belong to the visual characteristics of a game. The question that arises at this point is how exactly the visual characteristics relate to the gameplay of a game?

Scholarly approaches which conceptualize computer games from the point of view of their image help to shed more light on this issue. In contrast to Galloway's opposition of gameplay *versus* aesthetics / image in cases of game art, approaches from visual culture allow us to think of computer games as an interplay of gameplay *and* aesthetics / image. They all share an emphasis on the interrelation between the visual and the interactive nature of the computer game.

In their seminal article on in-game photography titled "Point and Shoot", Cindy Poremba notes that "digital games are commonly mediated through a (more or less) ambient cinematic camera".[30] Emphasizing a duality of camera and gameplay, they point out the player's "hybrid role" in many 3D computer games: "As camera avatars, players not only navigate through the game world, they film it as well".[31] While it is debatable whether players necessarily film the game world, it seems uncontroversial to say that they at least frame it by means of an operable camera. In most 3D games, the player controls two entities, namely the player-figure (often referred to as the "avatar") and the camera. This hybridity is represented in the layout of contemporary game controllers which possess two analog sticks. The left stick commonly allows players

[28] *Grand Theft Auto V* (2013), Rockstar Games, PlayStation 3.

[29] Wikipedia: "Development of *Grand Theft Auto V*", https://en.wikipedia.org/wiki/Development_of_Grand_Theft_Auto_V (last seen: August 1, 2021).

[30] Cindy Poremba: "Point and Shoot: Remediating Photography in Gamespace", in: *Games and Culture* 2/1, op. cit., p. 49.

[31] Ibid.

to navigate the avatar, while the right stick controls the camera-view. The camera-view is not always identical with the view of the player-figure.

In his book *Video Game Spaces: Image, Play, and Structure in 3D Game Worlds*,[32] Michael Nitsche analyzes the many facets and layers of video game spaces. The game's image comes into focus as part of the mediated space of games that is "defined by the presentation, which is the space of the image plane and the use of this image including the cinematic form of presentation".[33] Nitsche emphasizes the interactivity of computer game images:

> Players are free to explore and interact with [the game image] directly. Interactors might enter an expressive cinematic space, but now they can act in it. The necessary eye of the virtual camera makes these spaces cinematic and the interaction makes them accessible much like architectural structures. The player experiences game spaces in a combination of both, continuous navigable space and cinematic space.[34]

While both Poremba and Nitsche emphasize the significance of the game camera and the game image in computer gameplay, some scholars aim to conceptualize computer games in general from the perspective of the image. For them, computer games *are* specific kinds of images.

In game studies, the mythical history of the narratology versus ludology debate[35] suggests that games can either be conceptualized as "texts" (narratology) or as "games" in their own right (ludology). Between these two options, German game art scholar Stephan Schwingeler proposes considering a third path, that is, to conceptualize games from the perspective of their image. This perspective is additionally promoted by German media scholar Stephan Günzel[36] and art historian Thomas Hensel.[37] Schwingeler suggests that apart from carrying the notion of the image in its name – "video game" – another reason to take this perspective is

[32] Michael Nitsche: *Video Game Spaces: Image, Play, and Structure in 3D Game Worlds*, Cambridge / Mass. 2008.

[33] Ibid., p. 16.

[34] Ibid., p. 85.

[35] See, for example, Gonzalo Frasca: "Ludologists Love Stories, Too: Notes from a Debate That Never Took Place", in: Marinka Copier and Joost Raessens (ed.): *Level Up Conference Proceedings: Proceedings of the 2003 Digital Games Research Association Conference*, Utrecht 2003, pp. 92–99, https://ludology.typepad.com/weblog/articles/Frasca_LevelUp2003.pdf (last seen: August 2, 2021) and Espen Aarseth: "A Narrative Theory of Games", in: *FDG 2012 Proceedings of the International Conference on the Foundations of Digital Games*, Raleigh 2012, pp. 129–33, https://doi.org/10.1145/2282338.2282365 (last seen: August 2, 2021).

[36] Stephan Günzel: *Egoshooter: Das Raumbild des Computerspiels*, Frankfurt am Main 2012.

[37] Stephan Schwingeler: *Kunstwerk Computerspiel – digitale Spiele als künstlerisches Material: eine bildwissenschaftliche und medientheoretische Analyse*, Bielefeld 2014, here p. 139.

that computer games consist "to a large extent of images".[38] Referring to Lambert Wiesing's modes of images, he suggests that the computer (game) image "exists basically in three modes which differ with regard to motion and perception: 1. the static image [e. g., statistical graphs in game menus or images of game characters S. M.], 2. the moving image [e. g., in cutscenes], 3. the interactive simulation image [e. g., in main gameplay]".[39] While static and moving images are commonly perceived passively, interactive images are commonly triggered actively by a user during gameplay.[40]

Thomas Hensel emphasizes this action dimension of game images: Drawing on Kenneth Burke's theory of action and John L. Austin's speech act theory as well as from Horst Bredekamp's work on *Image Acts*[41], he conceptualizes the computer game as an image act (Bildakt). Due to the double-sided nature of digital images as proposed by Frieder Nake[42], Hensel suggests regarding a digital image on a computer as a manipulable "double image".[43] Such images simultaneously consist of a visual surface and an invisible underside made up of (machine readable) code. Emphasizing the coded under-side of the image, Hensel goes on to say that computer *game* images are better understood as performative images and not as representational images. While playing a game, the players do more than merely appreciate the aesthetics of the computer game image; Hensel argues that they also interact with these images during gameplay. In other words, interacting with the game's images is an essential part of the gameplay performance.[44]

38 Ibid., p. 140.
39 Ibid., p. 140–141.
40 Ibid., p. 141.
41 Horst Bredekamp: *Image Acts: A Systematic Approach to Visual Agency*, Berlin, Boston 2018.
42 Frieder Nake: "Das doppelte Bild", in: Margarete Pratschke (ed.): *Digitale Form. Kunsthistorisches Jahrbuch für Bildkritik*, Berlin 2005, pp. 40–50.
43 Thomas Hensel: "Uncharted. Überlegungen zur Bildlichkeit des Computerspiels", in: Gundolf S. Freyermuth and Lisa Gotto (ed.): *Bildwerte: Visualität in der digitalen Medienkultur*, Bielefeld 2013, pp. 209–235, here p. 217.
44 For Hensel, computer game images can even be seen as double image acts. Firstly, computer game images are image acts similar to operable icons on computer desktops. They exist only in the moment of their execution. Hensel calls this "performativity of first order" (p. 226). Secondly, computer game images are "double inter(re)active image acts" in that in computer games representations of objects can turn into these objects. This means that these images refer to their own mediality. As an example Hensel mentions Resident Evil 4, in which "a two-dimensional painted wine bottle from a still-life [bursts] paradoxically into broken pieces as soon as the player shoots it" (p. 227). Since the images of the second kind are self-reflexive about their own mediality Hensel classifies them as "performativity of second order" (p. 226).

In his book *Egoshooter,*[45] Stephan Günzel analyses the spatiality and pictorial nature (Bildlichkeit) of first person-shooter games, in particular. He focuses on the construction of their image as well as its cybernetic nature, referring to computer games as "interactive image objects".[46] The notion of the image object is derived from phenomenologist Edmund Husserl, for whom an image consisted of a tripartite structure: the image carrier, image content, and image object.[47] The image carrier describes the material through which an image is mediated. The image content describes its "sujet", that is, what the image displays. And, finally, the image object refers to the image as a phenomenon of perception, that which is produced when an image is perceived. Günzel writes, accordingly: "Husserl uses the term 'image object' to refer to the immaterial image appearance or the perceptual phenomenon of the image".[48] For Günzel, it is indeed this perceptual phenomenon which computer game players manipulate through the act of playing. In his book, Günzel develops the thesis that the emergence of the first-person-shooter game in the 1980s or 1990s (depending on which games are accepted as the benchmark) marks the moment in history when computer games can be considered an independent and autonomous medium in their own right for the first time.[49] Constitutive for first-person-shooter games is that the player interacts with a particular 3D-image which is defined by its construction in the form of its central perspective, its depth spatiality, and its interactivity[50], regardless of whether the game is a simulation of the physical world or if it presents a game world of its own without an external referent.

This brief review of different concepts of the computer game as an image shows that all authors refer to some extent to the *interactivity* of the computer game image. It is remarkable, though, that none of the authors refers to its inherent *ergodicity*.[51] The ergodicity of the game image describes its specific condition. If there is indeed a shift away from ludology, narratology, and the *computer-game-as-cybertext* towards a pictorial understanding of games and the *game-as-image*, then the authors just cited seem to omit the logical next step, which is to acknowledge that games are not merely *interactive* images but also *cyber*images.

45 Stephan Günzel: *Egoshooter: Das Raumbild des Computerspiels*, op. cit.
46 Ibid., p. 44.
47 Ibid., p. 43.
48 Ibid.
49 Ibid., p. 49.
50 see: Ibid.
51 Espen Aarseth: *Cybertext. Perspectives on Ergodic Literature*, op. cit.

Unlike the conditional *cyber*image of the computer game, the *interactive* image is a characteristic of interactive media art, as Olli Leino has suggested.[52] Accordingly, artworks like *Legible City* by Jeffrey Shaw[53] can be operated by means of an interface. They can be freely navigated by a user, as the user controls the camera in this virtual world at will. Interactive media art, however, lacks the ergodic dimension of computer games as it does not evaluate the quality of the interaction. In other words, users of interactive media art can neither fail nor succeed when interacting with a piece of media art. Computer games as images, however, are conditional on the functioning of a cybernetic system and the performance of a player, as I will show in the next section.

The computer game as a conditional *cyberimage*

In his seminal book from 1997, Espen Aarseth prominently argues that computer games are a specific form of text, namely a cybertext.[54] Coming from comparative literature studies, Aarseth chose to conceptualize games as a form of text rather than as an image. As far as he is concerned, these cybertexts consist of a machine and a textual surface which require the input of an operator. In order to distinguish cybertexts from hypertexts,[55] Aarseth suggests that cybertexts are characterized by their ergodicity, which is something hypertexts lack. Ergodic is a hybrid word consisting of the Greek hodos (path) and ergon (work). Ergodic media then require "non-trivial effort"[56] of their users to be traversed. In other words, the user's input is evaluated by the computer game, and depending on the evaluation, the user can see more parts of a given game world or not. If Schwingeler then proposes the third way (that is, to conceptualize games from the perspective of their image), then computer games should be called

[52] Olli Tapio Leino: "Re-Conceptualising the Play-Element in Electronic Art", in: *ISEA 2011 Istanbul. The 17th International Symposium on Electronic Art*, Istanbul 2011, https://isea-archives.siggraph.org/wp-content/uploads/2020/07/ISEA2011_274_OLLI-LEINO.pdf (last seen: August 2, 2021); Olli Tapio Leino: "Playability and Its Absence–A Post-Ludological Critique", in: Digital Games Research Association (ed.): *Proceedings of DiGRA 2013: DeFragging Game Studies*, Atlanta 2013, http://www.digra.org/digital-library/publications/playability-and-its-absence-a-post-ludological-critique/ (last seen: August 2, 2021).

[53] *The Legible City* (1988), Jeffrey Shaw, Interactive Installation.

[54] Espen Aarseth: *Cybertext. Perspectives on Ergodic Literature*, op. cit.

[55] Hypertexts are interactive texts but they are lacking ergodicity. Hence, hypertexts are to cybertexts what interactive media art is to cyberimages.

[56] Espen Aarseth: *Cybertext. Perspectives on Ergodic Literature*, op. cit., here p. 1.

cyberimages in all consistency.[57] For example, when playing Tetris,[58] I as a player initiate a series of images depending on how well I play. In turn, the series of images I initiate relays the quality of my interaction back to me. If I am performing very badly, Tetris will end and I will have to start from the beginning.

It has already been established that most in-game photographs are not taken in games like Tetris but rather in games like Grand Theft Auto V. That game features a photorealistic 3D world that is constructed in central-perspective and accessed via a navigable camera mimicking the third-person perspective. The camera and the player-figure are controlled semi-independently from each other. In games that are controlled from the first-person perspective, the camera corresponds to the view of the player-figure. Although games with three-dimensional photorealistic landscapes have a distinctly different visual appearance than two-dimensional games like Tetris, they both possess what Olli Leino calls a gameplay condition.[59] Following Sartre's notion of the human condition, the gameplay condition describes the resistance that a game presents to a player and that limits their freedom to do whatever they want in a game. In the case of Grand Theft Auto V, this means that if I wish to navigate through the game world to take an in-game photograph with the simulated smartphone camera, I cannot simply move my player-figure anywhere I want and occupy each possible point of view. The places my player-figure can move to are restricted by the game and the simulated skills of my player-figure. For example, if the player-figure is not capable of flying, I will not be permitted to take an aerial photo from a given landscape. Or if my player-figure is vulnerable to bullets fired by enemy gang members, then certain areas will be harder for my player-figure to reach. This obviously limits the possible photos which I can take in Grand Theft Auto V.

Only Stephan Günzel seems to refer to this conditionality when he analyzes the different images of death and dying which occur in first-person-shooter games when the player-figure, for example, gets hit

[57] A cyberimage is then a hybrid of a machine (the computer) and image (all visual signs perceivable by humans involved in computer gaming) where each realized sequence of images depends on the performance of a player with the machine which is in turn evaluated by the machine (Aarseth 1997).

[58] Tetris (1989), Nintendo, Game Boy.

[59] Olli Tapio Leino: "On the logic of emotions in play", in: Society of Simulation and Gaming of Singapore (ed.): *Proceedings of ISAGA 2009 conference*, Singapore 2009; Olli Tapio Leino: "Emotions in Play: On the Constitution of Emotion in Solitary Computer Game Play", PhD Thesis, Copenhagen 2010, https://en.itu.dk/-/media/EN/Research/PhD-Programme/PhD-defences/2010/Olli-Thesispdf.pdf (last seen August 2, 2021).

too often by enemy bullets or touched by monsters. The death screen marks the momentary ending of the game performance. The simplest image of this kind shows merely the inscription "game over" on black ground. The more complex images of this kind fade out or color the screen in red, such as in Half-Life 2 and Max Payne 2: The Fall of Max Payne.[60] Furthermore, when the interactive image of a game fades out due to a game over, this marks the game image "becoming picturesque" ("Malerischwerden des Bildes").[61] The game image then loses its conditionality. In other words, when dying in a game, "death appears as a halt of the image or as the impossibility of interaction".[62] In some cases, though, this death image is still an interactive image. Depending on the game, it sometimes requires the push of a button to lead to the game menu – where players may potentially choose to reload the latest savegame. On a side note: this case makes it possible to clarify the difference between the interactive and the conditional image. The interactive image of the death screen results from a failure to meet the conditions required by the conditional image of the computer game. In other words, players can fail in terms of the conditional image, but they cannot fail at using the interactive image. Sometimes, of course, the death screen is reduced to a static image which may automatically lead to the game menu after a while without any input from the player. Contrary to interactive media art, the computer game image is not about performing any kind of (inter)action; instead, it's concerned with performing the right (inter) action at the right time and in the right place against the resistance of the game. This condition impacts in-game photographical projects, as the following example shows: When pursuing their in-game photographical project "Hi, my name is...",[63] two students of mine, Sandra Buttress and Philipp Röbke, ventured through Los Santos in Grand Theft Auto V to take photographs of the street art spread out all over this simulated city. Afterwards they commented on the impressive resistance with which the game opposed their project: for example, their player-figure was run over by cars and got shot in several gang wars. This, of course, is not visible in the resulting photographs. The resistance may be recognized and perhaps even sensed, but usually only by players who are familiar

[60] *Max Payne 2: The Fall of Max Payne* (2003), Rockstar Games, Microsoft Windows; Stephan Günzel: *Egoshooter: Das Raumbild des Computerspiels*, op. cit., here pp. 229–231.

[61] Ibid., p. 230.

[62] Ibid., p. 231.

[63] *Hi, My Name Is...* (2016), Sandra Buttress and Philipp Röbke, In-Game Photography, http://www.digarec.de/2021/06/07/the-real-virtual-digarec-in-game-photo-gallery (last seen: June 30, 2022).

with the game and know that taking a photograph in the game means taking a certain risk. This condition is inscribed in the process of taking any in-game photograph while the game is following normal procedure. And now, finally, I wish to show how this condition affects artistic in-game photography.

Three conditionalities of in-game photographs

Artistic in-game photography seems to depend on different dimensions of conditionality which need to be taken into consideration when describing this form of art. First, in-game photography can be thought of as a resulting in-game photograph which is dependent on a game's conditional *cyberimage*.

Second, depending on the game, dealing with this conditional *cyberimage* requires certain gameplay skills on the part of the player. Since gameplay skills not only depend on the specific game but are also subject to the player's human condition, one might even say that the *cyberimage* is a doubly conditional image. This may be further illustrated by works of my students Fabian Brandtner, Marie-Lena Höftmann, and Lennart Mackies, who were all pursuing different in-game photographical projects in Dark Souls III, Sekiro: Shadows Die Twice, and Bloodborne.[64] These games made by the developer FromSoftware are popular for the high demands they place on player skills, as the opponents in these games are notoriously difficult to beat. The difficulty of these games is simultaneously their main appeal. In many places in these games, it is therefore equally difficult to take photographs, as the player-figures are constantly being attacked by opponents. In order be able to take time to frame the motif of choice, the player-figure either must kill the opponents in a given place or successfully sneak around these opponents without being detected. Fabian, Marie-Lena, and Lennart unanimously reported that in order to be able to take in-game photos, they not only had to have the physical ability to operate the game controllers but also had to put in a lot of training and extra time to pursue their projects.

One can argue, then, that (first-person) computer games are by default doubly conditional images and that artistic in-game photography does at least include a third condition. The latter is an aesthetic condition which

[64] *Dark Souls III* (2016), FromSoftware, Bandai Namco Entertainment, Xbox One; *Sekiro: Shadows Die Twice* (2019), FromSoftware, Activision, PlayStation 4; *Bloodborne* (2015), FromSoftware, Sony Computer Entertainment, PlayStation 4.

determines the respective shot to be taken. For example, if I try to photograph a water tank in Grand Theft Auto V in the style of renowned industrial photographers Bernd and Hilla Becher, I as the player / photographer first need to be physically and mentally able to take that shot (human condition). Second, I am also required to make sure that my avatar does not get killed (gameplay condition). And, finally, since Bernd and Hilla Becher's photographs are characterized by a specific aesthetic, I might also wait for the right lighting and try to frame the water tank accordingly, and only then push the trigger of the simulated smartphone camera in Grand Theft Auto V.

Although the resulting product – that is, the in-game photograph – is simply a still image or a screenshot,[65] there are different strategies of artistic in-game photography which intertwine the gameplay condition, the image, and strategies of countergaming (Galloway) in different ways. These will now enable me to reread Overweg's work in light of the conditional *cyberimage*.

Strategies of artistic in-game photography – Robert Overweg's *The End of the Virtual World*

Robert Overweg's photo series *The End of the Virtual World,*[66] which I introduced in the beginning, makes use of iconic first-person shooter games, such as Left 4 Dead 2, Half-Life 2, Counter-Strike: Source, and Call Of Duty: Modern Warfare 2. They all feature a gameplay condition in that the game's player-figure and hence the game's image is at risk of transforming from conditional *cyberimage* to static image during gameplay, since the player's avatar is oftentimes under attack by in-game enemies. For his project, though, Overweg moves his player-figure to the edges of the respective game worlds in order to take these photographs. In those places, where no opponents attack the player character, his player-figure is not immediately at risk. This distancing of the player-figure from dangerous opponents is a viable way to deal with the gameplay condition. Elsewhere I argued that computer games and specifically first-and third-person shooter games consist of an essential

[65] See Matteo Bittanti: "The Art of Screenshoot-Ing: Joshua Taylor, Videogame Photographer", in: *Mister Bit – Wired IT*, op. cit.; Christopher Moore: "Screenshots as Virtual Photography: Cybernetics, Remediation, and Affect", in: Bode and Longley Arthur (ed.): *Advancing Digital Humanities: Research, Methods, Theories*, op. cit.

[66] Robert Overweg: "The end of the Virtual World", in: *Shot by Robert –Photographer in the Virtual World*, op. cit.

threat-structure or a "fear-structure".[67] The threat-structure consists of a play space between a threatening entity and a threatened entity. Hence, depending on the proximity or distance of the threat, the play space can be larger or smaller or more expanded or more contracted. The more contracted the space between these two entities, the more pressing the gameplay condition and the more at risk the *cyberimage* of the game. By moving away from threatening entities, Overweg makes the gameplay condition less pressing and the *cyberimage* less at risk. Pressing the screenshot button is then a comparatively simple task to perform in order to achieve an in-game photograph of this kind.

This brief excursion is key to understanding Overweg's series as being media-reflexive in that his photos reveal something about the logic of computer games. On a material level, Overweg's in-game photographs are no *cyberimage*s. Hence they cannot be interacted with like *cyberimage*s, nor do they evaluate this interaction. Instead they exist as static images stored in image file formats such as jpeg or tiff. And yet, on the level of the image content, they nevertheless show places of game worlds where the conditionality of the *cyberimage* simply ceases to be effective. In most computer games, common gameplay action hardly ever takes place near the limits of the designed and programmed game world. Instead designers usually hide these limits of the game world behind seemingly insurmountable landscape features. The strategy behind Overweg's photographs can thus be described – drawing on Galloway – as a "foregrounding" of the "apparatus" which games are made of, hence exposing the mediality of the given game.[68] Clearly, also, the apparatus (the game engine, code, textures etc.) which becomes visible here is part of the gameplay condition, that is, part of the *cyberimage* of the computer game. In turn, this means that Overweg's in-game photographs belong to the genre of media-reflexive game art.

[67] Sebastian Möring: "Furcht im Gameplay – Analyse von Actioncomputerspielen mithilfe von Martin Heideggers Sein und Zeit", MA Thesis, Potsdam 2010; Sebastian Möring: "Games and Metaphor – A critical analysis of the metaphor discourse in game studies", PhD Thesis, Copenhagen 2013; Sebastian Möring: "Distance and Fear: Defining the Play Space", in: Espen Aarseth and Stephan Günzel (ed.): *Ludotopia. Spaces, Places and Territories in Computer Games*, Bielefeld 2019, pp. 231–44.

[68] Alexander Galloway: *Gaming: Essays on Algorithmic Culture*, op. cit.,here p. 114.

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Nine Swimming Pools and a Broken Glass

Alan Butler

NINE
SWIMMING
POOLS

NINE
SWIMMING
POOLS









The Phantom of the Mirror: The Screenshots of Mario Santamaría

Katrina Sluis

Mario Santamaría is part of a growing canon of screenshot photographers drawn to the uncanny crash of interface, database, camera and screen produced by the 'nine eyes' of the Google Street View camera. In contrast with other artists who have heroically pointed their mouse at the dazzling vastness of the Google Street View landscape,[1] Santamaría has weaponised the screenshot to probe Google's scopic regime and the sociotechnical infrastructure that sustains it. In 2013 the artist began a trilogy of works in response to Google Art Project, a cultural interface launched in 2011 hosting virtual tours of over 2,000 leading museums and their collections. A spectacular feat of engineering and cultural diplomacy, Google Art Project functions as a photographic apparatus which depends on Google Street View technology and custom Gigapixel cameras to produce an immersive space for consuming art. In *Trolling Google Art Project* (2013–ongoing) Mario Santamaría mobilises the screenshot as an artistic strategy to break the transparency of Google's interface and expose its representational paradigm.[2]

Google Arts & Culture embodies a powerful dream of universal access to culture – combining the informational surplus of a database with the spectacle of the grand tour, available to anyone with access to a browser. When placed inside the museum or gallery, Google's Street View technology paradoxically serves to valorise analogue cultural value by simulating and reinforcing the architecture of the physical museum and the viewing subject. As Santamaría observes, this produces a "network of tunnels mapped with photographic shots" experienced as a scrollable "bubble of images that simulate a similarity of perspective with a human body".[3] Here, the transparency of the camera collides with the transparency of the

1 Leading artists in the genre include Jon Rafman, Doug Rickard and Michael Wolf. For a comprehensive analysis see: "Who did it better in Google Street View World Championship" hosted by You Must Not Call It Photography If This Expression Hurts You at Centre Culturel Suisse, November 7, 2019.

2 Mario Santamaría: "Trolling Google Art Project", in: *mariosantamaria.net*, http://mariosantamaria.net/trolling.html (last seen: July 28, 2021).

3 Mario Santamaría: "Explore the Non-Imaginary Museum!", Screenwalk for PhotoIreland Festival, July 12, 2020, https://www.youtube.com/watch?v=ZPRdyJV6wWo (last seen: July 28, 2021).

interface; the Cartesian world glorified by the photograph and browser window purifies and conceals a computational backend of unknowable operations. In observing this paradox or "crash" of technologies produced by Google Arts & Culture, Andrew Dewdney has argued what is being reproduced by Google is actually the limits of representation, which turns "photography into heritage and ignore[s] the new reality or materiality of the image on screen".[4]

When exploring the hallways, galleries and grand theatres of Google's platform, Santamaría is mindful of this paradox. In *The Phantom of the Mirror* (2013–ongoing), Santamaría captures screenshots of instances where Google's camera has inadvertently captured and reproduced its own image in the Art Project interface. These are then shared on Tumblr, producing a restless scroll of machinic self-portraits in which mirrored surfaces reflect the nonhuman gaze of the camera, rather than the human spectator.[5] Adorned in a kitsch anti-reflective silver cape, perched on top of a perfunctory trolley, the Google camera appears as a phantom, or an alien being from another dimension. Whilst the camera relies on a human operator to manoeuvre it through the grand hallways, Santamaría's screenshots emphasise bodies and other unwanted residues that have been automagically erased, blurred, cut off, and made more "content-aware" in this process of capture. In capturing this documentation, Santamaría states he is most interested in "the breakdown of the simulation, when this image capture fails, when there are some elements that take us out of that narrative that Google has proposed to us".[6] What results is a counter-image in which the history of human cultural expression is reimagined as a robot readable world and the human is rendered marginal to the circulation and consumption of art. But perhaps this is not surprising: despite its celebration of democratic access, Google Art Project operates as a mechanism of extraction in which the cultural value of art is substituted for the value of the metadata generated by public interaction with the history of art. Rather than sharing this epistemic harvest as a public cultural resource, it remains with Google. Santamaría is keen to emphasise that this process of digitisation and extraction does not serve

4 Andrew Dewdney: "Curating the Photographic Image in Networked Culture", Keynote presented at *Kraesj! Brytninger i fotoarkivet*, Oslo , May 5–6, 2014. See also Andrew Dewdney: *Forget Photography*, London 2021.

5 Mario Santamaría: *The Phantom of the Mirror* (2013–ongoing), https://the-camera-in-the-mirror.tumblr.com (last seen: July 28, 2021).

6 Mario Santamaría: "Explore the Non-Imaginary Museum!", op. cit.



Fig. 1: Mario Santamaría: *The Phantom of the Mirror, Palais Garnier. Paris, France*. 2013–ongoing. Website: https://the-camera-in-the-mirror.tumblr.com



Fig. 2: Mario Santamaría: *The Non-Imaginary Museum, Art Gallery of South Australia. Adelaide, AU*. 2013–ongoing, Website: https://righted-museum.tumblr.com

the spectator, stating that his screenshots make clear that Google Art Project "is not for us". [7]

In hunting for cracks in Google's scopic regime, Mario Santamaría pays special attention to the blur – a feature which is usually expunged from professional photographic production. When navigating Google Art Project, blurring appears when there is a lag, or friction which breaks the illusion of continuity. This is emphasised most in *Running through the Museum*:[8] a continuous screen capture documenting Santamaría's attempt to traverse Google's reproduction of the Palace of Versailles in 1 min 8 seconds, in homage to Jean-Luc Godard's 1964 film Bande à part (Jean-Luc Godard, France 1964). In the resulting video, the spectacle of the architecture is undermined by the frustrated labour of repeated clicking, buffering and the limited options for physical interaction. As pixelated images stutter and interrupt the vista of Versailles, Google's interface is revealed as a Frankenstein construct made up of disparate concatenated images subject to different temporalities. For Santamaría, the pixelated preview image thrown up by the interface is an "image before any image"[9] – it anticipates an image and reduces its resolution or, in case of a failure, replaces it. Such glitches and computational artefacts underline the sociotechnical apparatus that sustains the illusory art panorama.

The blur is further emphasised by Santamaría in *The Non-Imaginary Museum* (2013–ongoing), which presents artworks adorning the walls of the Google Art Project that have been obscured and rendered unintelligible by a Gaussian algorithm due to copyright restrictions.[10] Probing the limits of Google's reproductive paradigm, these screenshots appear to undermine Google's emphasis on universal access to public culture. Santamaría draws attention to the way different values are encoded into the interface, arguing "these works are blurred because their time of economic exploitation continues, because they are commercialised in another place or another format".[11] The screenshot captures a moment where analogue models of value are encoded into a computational environment: echoed by the remediation of the photographic act in the gesture of the screen capture itself.

7 Mario Santamaría, interview by the author, August 30, 2020.
8 Mario Santamaría: *Running through the Museum* (2013), https://vimeo.com/79060771 (last seen: July 28, 2021).
9 Mario Santamaría: "Explore the Non-Imaginary Museum!", op. cit.
10 Mario Santamaría: *The Non-Imaginary Museum* (2013–ongoing), https://righted-museum.tumblr.com (last seen: July 28, 2021).
11 Mario Santamaría: "Explore the Non-Imaginary Museum!", op. cit.

Writing in 1995, media scholar Lev Manovich argued that the afterlife of photography in computational culture could be understood as a paradox in which "the digital image annihilates photography while solidifying, glorifying and immortalizing the photographic."[12] Mario Santamaría's work confronts this cannibalisation of photographic representation by computational systems on the one hand, and the privatisation and colonisation of public culture by Silicon Valley on the other. In questioning the supposedly "neutral" eye of Google, we are reminded – following Geraldine Juarez' critique[13] – that Google's platform does not present an embodied vision grounded in situated knowledge. Rather, as a database, it "represents while avoiding representation."[14]

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"Who did it better in Google Street View World Championship" by the project known as You Must Not Call It Photography If This Expression Hurts You at Centre Culturel Suisse, November 7, 2019. https://www.youtube.com/watch?v=FUrsScyLl-A (last seen; November 30, 2021).

[12] Lev Manovich: "The Paradoxes of Digital Photography", in: Hubertus Amelunxen, Stefan Iglhaut and Florian Rötzer (ed.): *Photography After Photography*, Munich 1995, pp. 57–65.

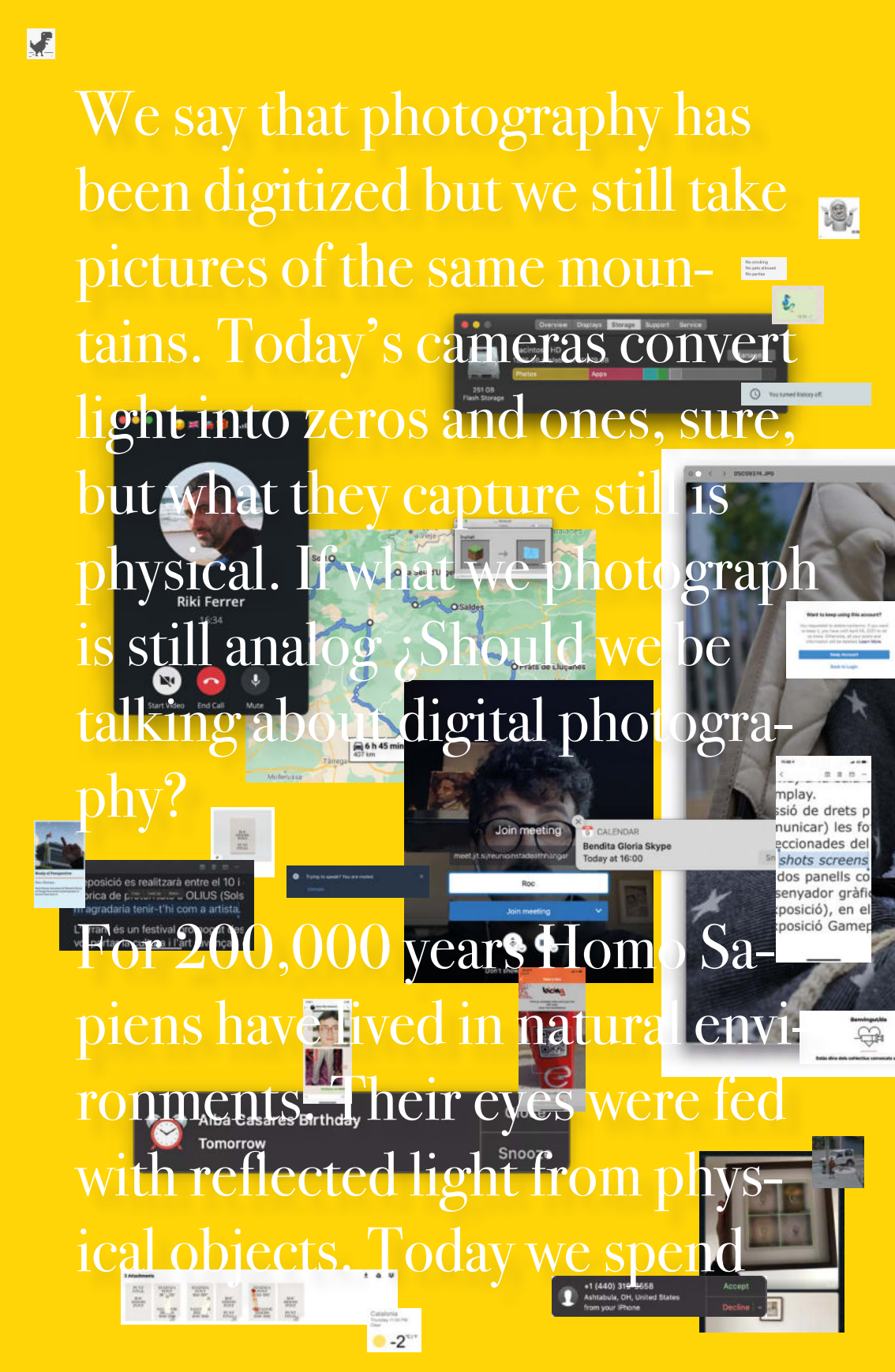
[13] Geraldine Juarez: "Intercolonial Technogalactic", in: Anna-Sophie Springer et al. (ed.): *Reverse Hallucinations in the Archipelago*, Berlin 2017, pp. 152–168, here p. 158.

[14] Donna Haraway, "Situated Knowledges: The Science Question in Feminism and the Privilege of Partial Perspective," in: *Feminist Studies* 14/3 (1988), pp. 575–599, here p. 581, quoted in Geraldine Juarez: "Intercolonial Technogalactic", in: Anna-Sophie Springer et al. (ed.): *Reverse Hallucinations in the Archipelago*, Berlin 2017, pp. 152–168, here p. 158.

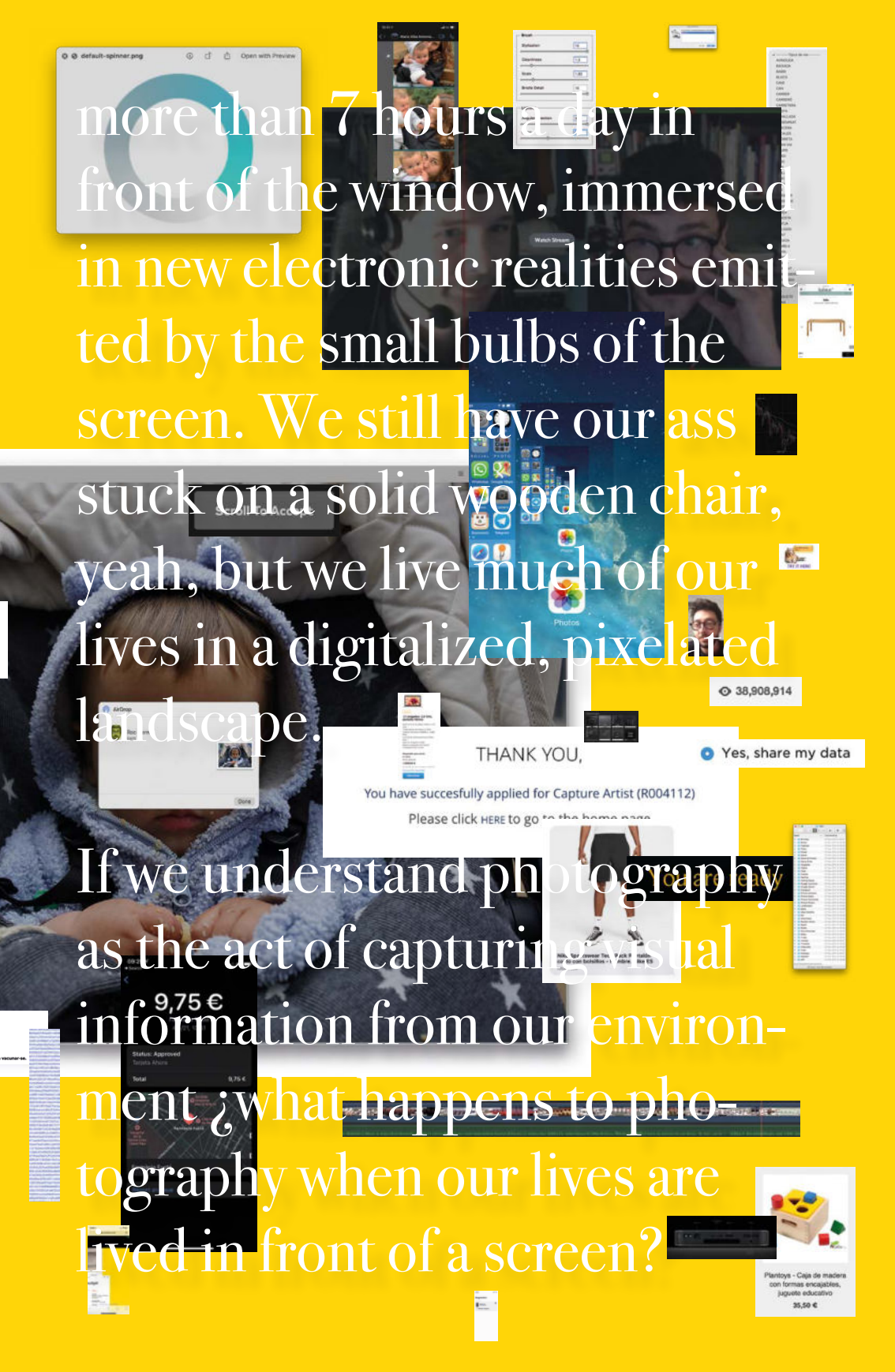
Hacer Pantallazo

Roc Herms

We say that photography has been digitized but we still take pictures of the same mountains. Today's cameras convert light into zeros and ones, sure, but what they capture still is physical. If what we photograph is still analog ¿Should we be talking about digital photography?



For 200,000 years Homo Sapiens have lived in natural environments. Their eyes were fed with reflected light from physical objects. Today we spend



more than 7 hours a day in front of the window, immersed in new electronic realities emitted by the small bulbs of the screen. We still have our ass stuck on a solid wooden chair, yeah, but we live much of our lives in a digitalized, pixelated landscape.

If we understand photography as the act of capturing visual information from our environment ¿what happens to photography when our lives are lived in front of a screen?

Isn't it relevant what we see? If we can shortcut screen captures ¿shouldn't we be considering Screenshots as a new form of photography?

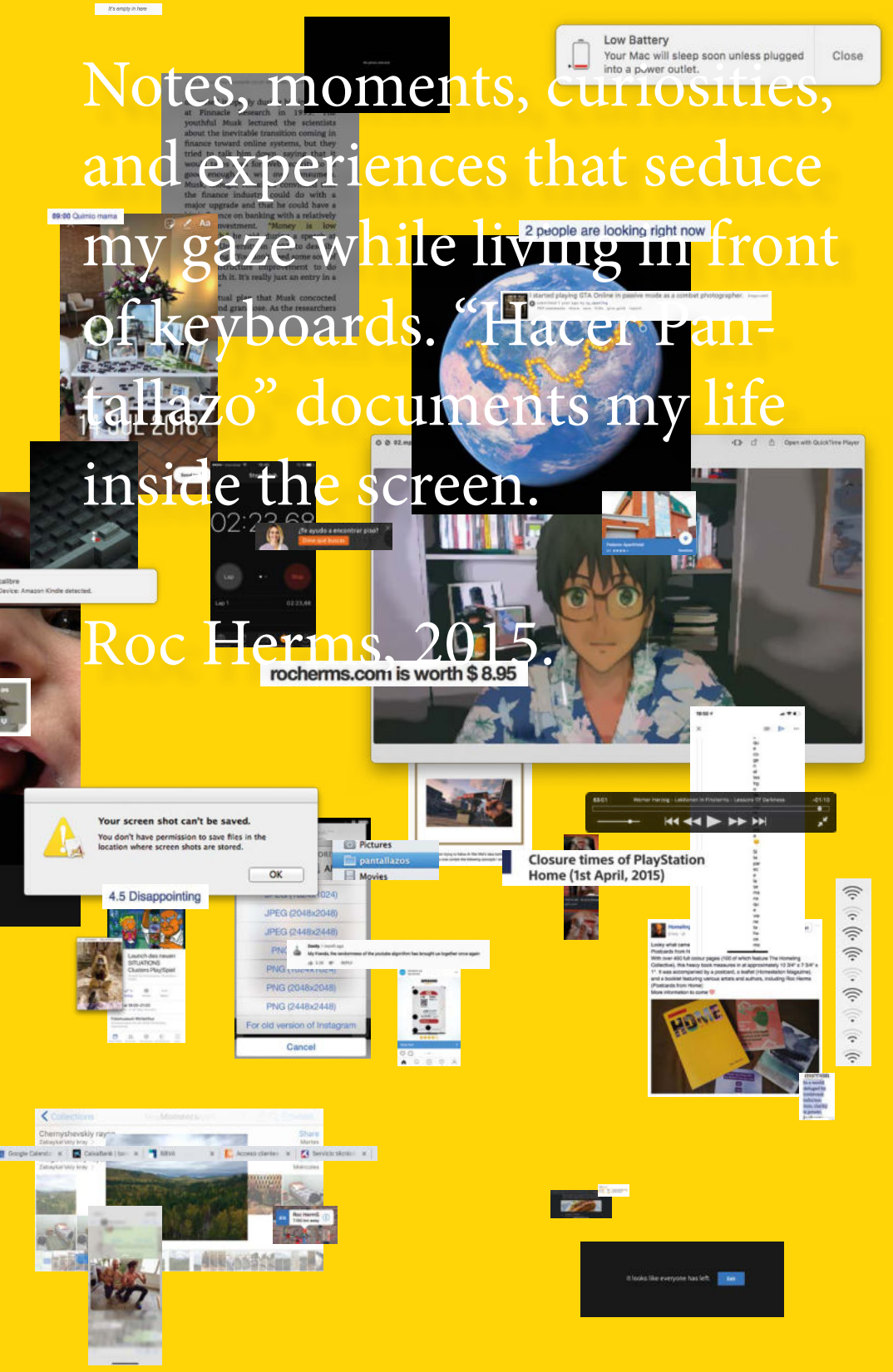


The final step into photography's digitalization, where the camera is digital as well a the subject in front of it.

Thanks to small little algorithms, "Hacer Pantallazo" automatically collects every screenshot I take on each of my screens.

Notes, moments, curiosities, and experiences that seduce my gaze while living in front of keyboards. “Hacer Pan-tallazo” documents my life inside the screen.

Roc Herms, 2015.



Documenting Witnessing: Two Cases of TV-Screen Photography

Friedrich Tietjen

Witnessing Eichmann

When the trial of Adolf Eichmann at the Jerusalem District Court got underway on April 11, 1961, it was an international TV event. Video cameras were set up to record the proceedings, and the tapes were distributed to TV companies worldwide, which then included the footage in their news programs, weekly summaries and other formats. And while the trial was by far not the only event that made headlines in 1961 – Yuri Gagarin became the first man in space on April 12, a coup d'état shook South Korea on May 16 and the Berlin Wall was erected on August 13, to name but a few – the trial remained on TV, in particular in Germany. When Eichmann received his sentence on December 15, 1961, one TV viewer grabbed a camera and took a photograph of the screen at the very moment when, standing in his glass box, the defendant learned that he was to die by hanging.[1]



Fig. 1: Unknown photographer: screen photography from the trial of Adolf Eichmann. 6X6 roll film negative. Germany (?), 1961. Taken from the author's personal archive.

[1] The specific moment can be seen in the ARD alpha documentary *Eine Epoche vor Gericht* (1961/1962), cited here on YouTube at: https://youtu.be/0TX-xlAiie4?t=6383 (last seen:

After Eichmann had been brought to Israel on May 22, 1960, fierce controversies ensued as to whether he should be put on trial there, given that he had not been lawfully extradited, but abducted from Argentina. Also under debate was the fact that he would be subjected to the laws of a state that did not exist when he committed his crimes, and that the jury of judges – two of whom had escaped Germany and the Holocaust Eichmann had helped to set in motion – could hardly guarantee a fair trial. The act of broadcasting the proceedings was a means to prove the opposite: "From the moment Prime Minister David Ben-Gurion announced Eichmann's capture, Israel itself was on trial. The whole world seemed to be watching to see how we acquitted ourselves of the task we had undertaken", prosecutor Gideon Hausner wrote in his memoir.[2] And that task was not only to make Eichmann meet justice for his deeds. The trial also for the first time introduced a larger audience to the Holocaust, to the term itself as well as to what it stood for and how it was carried out. The court saw films taken after the liberation of the camps, and dozens of witnesses gave their testimony of personal encounters with the defendant and spoke of their relentless persecution, sometimes breaking into tears or fainting. Throughout these testimonies, Eichmann himself remained impassive, except for a nervous tic. Everything that happened in the courtroom came before the eyes of an international audience, at least in excerpts.

The photograph in question is the product of a single negative with no context or background whatsoever – no other images from the same photographer are known, and not even the brand of film can be determined.[3] What remains is the image itself and the fact that it was taken at all. But why was it taken? Photographing a TV in the 1960s was not uncommon; having entered living rooms *en masse*

December 6, 2021). With the exception of the sentencing, the historical video recordings of the Eichmann trial can be found on the YouTube channel "Eichmann Trial" operated by Yad Vashem and the Israel State Archives at: https://www.youtube.com/user/EichmannTrialEN (last seen: December 6, 2021).

2 Gideon Hausner: *Justice in Jerusalem*, New York 1966, p. 288. For a more detailed discussion of why and how the trial was put on TV, see Jeffrey Shandler: *While America Watches. Televising the Holocaust*, New York, Oxford 1999, pp. 83–132, and Judith Keilbach: "Eine Epoche vor Gericht. Der Eichmann-Prozess und das bundesdeutsche Fernsehen", in: Judith Keilbach et al. (ed.): *Völkermord zur Primetime. Der Holocaust im Fernsehen*, Amsterdam 2019.

3 The negative was sold as a single item on eBay in Germany. Measuring approximately 6x6cm, it was taken with a roll film camera. The shape of the screen suggests a TV set from the early 1960s, so that in all probability the photograph was indeed taken on the last day of the trial. From where it was sold, I also assume that the image was taken in Germany.

starting in the late 1950s, the sets were new and exciting objects in and of themselves and thus frequently appear in private photographs from that time.[4] However, given that private photography generally aims to capture pleasant subjects, such as seaside holidays, wedding parties and kids playing in the garden, photographing a war criminal at the moment he is sentenced to death on TV is a rather outlandish topic. And as it is barely visible at all in the photograph, it certainly was not the TV set that was of interest for the photographer – it was the image on the screen.

It is hard to imagine that anyone would include a print from this negative in their family photo album, surrounded by shots of happier and more intimate moments spent with family and friends. It is slightly easier to assume that the negative was printed and the photograph kept as a reminder of the trial and of what happened there. However, the overall necessity of having a print appears too marginal, in particular as Eichmann's trial was also in the newspapers; in other words, if an image was needed, it could have been found there, probably even in better quality. It appears that the image itself was less important than the act of taking it. At the time, advertisements praised TV's ability to grant people immediate access to the rest of the world from their armchairs at home. In setting the stage in Jerusalem, the Israeli government tried to make sure that the whole world could watch and hear the witnesses. After 114 days of being exposed to the horrors of the Holocaust, at least for one unknown viewer, it was not enough to have witnessed the trial – the witnessing itself needed to be recorded.

Music from the West

There weren't many music magazines in East Germany (GDR), and *Melodie und Rhythmus* (melody and rhythm) was the only one that covered contemporary pop music. As paper rationing allowed for only relatively small print runs, getting a copy of this sought-after magazine was an arduous task for music lovers. Moreover, *Melodie und Rhythmus* suffered another serious limitation – it dealt mainly with pop music from the GDR and other socialist countries. Anyone who was interested in Bob Dylan, *The Sweet* or *The Rolling Stones* needed to get their news and pictures via other means.

[4] For data on the distribution of TV sets in West Germany see Knut Hickethier (ed.): *Geschichte des Fernsehens in der Bundesrepublik Deutschland*, Munich 1993, Volume 1, p. 406.

One anonymous photographer[5] in the early 1980s apparently found two sources. She was able to get her hands on at least one copy of *Rocky*, a magazine from West Germany (FRG),[6] which she put on the carpet in her living room and photographed from cover to cover using her camera. And, as the TV set at home was tuned to receive programs from West Germany, she also pointed her camera to the screen and photographed music shows featuring artists such as *Boney M*, *Baccara*, Didi Hallervorden and others.

As no actual prints survived, it remains unclear what exactly she did with these photographs. However, interviews with other individuals living and photographing in the GDR at around the same time confirmed that such prints were sold clandestinely in schools and similar places.[7] The earnings from such transactions could be sufficient to buy a new camera, darkroom equipment, photographic paper and the necessary chemicals. Still, the practice was not without personal risk for both the photographers and their customers; at school the pupils' bags were occasionally searched by teachers or party secretaries, and if such contraband was found, it could result in expulsion or other forms of punishment.

Measured by conventional standards, the quality of most of these images is terrible. Black stripes erase parts of the image; as the cathode beam illuminates the TV-screen 30 times per second, the shutter speeds employed by the photographer apparently were faster than 1/30th of a second and thus would catch only parts of the image (and sometimes of the afterglow of the beam). And some of the TV images show weird patterns; these photographs were probably taken on days when the quality of reception of the TV signal was low. The varying perspectives on the screen suggest that the photographer didn't use a tripod or anything similar, resulting in blurs, an occasional lack of focus and sometimes parts of the TV set with its knobs and switches becoming visible.

5 Judging from some accompanying notes and other exposures from the same collection of negatives, the photographer probably was an apprentice at a bakery in Saxony, Germany.

6 If sent by mail, such magazines were routinely confiscated by GDR customs. The photographer probably received her copy as a gift when relatives from West Germany came for a visit. It is also possible, however, that she borrowed the magazine from a friend.

7 I became aware of this photographic practice only after coming across and purchasing the negatives from a flea market in Leipzig, Saxony. In the framework of a research project on private photography in East Germany, I conducted numerous interviews and was shown more such negatives and also learned a lot about the background of the practice. For the insights they shared with me, I am indebted to Martin Siebert (Ilmenau), Martin Weinhold (Berlin) and a third person who preferred not to be mentioned by name.



Fig. 2: Unknown photographer: screen photography from a West Germany TV show. 35 mm film negative. GDR, around 1980. Taken from the author's personal archive.

Indeed, in private photography, aesthetics is often given little or no attention. Few private photographers aspired (and aspire) to technical perfection. For most of them, photography is a means to an end; it is important that an image is made and that what it was meant to show is more or less recognizable. In other words, the act of taking an image can be as important as the image itself. And if the image is considered important, it doesn't matter if the heads in a group photograph are unfortunately cropped, if a flash has dyed some eyes devilishly red or – as is the case with this TV screen shot – if the photograph represents only part of what was meant to be shown. If this also applies to the photographs taken by the anonymous photographer, then her TV screenshots were clearly not only meant to represent her favorite bands and musicians. As the music was performed for both the TV cameras and for a live crowd, the photographer puts herself in the shoes of a member of that audience. With her camera in hand, she becomes part of a show that was – at least for her at that moment in history – as geographically unreachable as the moon.

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Blind Spots

Emily Wick

"Blind Spots" is a photographic work that explores a significant paradox of contemporary surveillance culture. In its original form, the series consists of a total of 58 screenshots of various CCTV cameras revealing blind spots of this mode of observation.

The use of surveillance cameras in public as well as private spaces follows the Foucaultian principle of "subjection through illumination". Facilitated by a mass of cameras, contemporary video surveillance is supposed to capture an overall view and erase spatial as well as temporal information gaps.

What happens, however, when the observer suddenly becomes the observed?

Based on Niklas Luhmann's systems theory, this phenomenon becomes a paradox with regard to the relationship between the monitor and the monitored, for complete control presupposes that the monitoring itself is monitored. In order to reach the goal of complete transparency, this enchainment can be – or must be – continued indefinitely, because every observation of an observation has in common with the observation before it that, as long as it observes, it cannot be monitored by itself. For this it needs a higher order observation. Thus, the paradox maintains itself and never leads to its ultimate goal of making the hidden fully visible.

The product of this condition is the inevitable occurrence of gaps, because every surveillance creates spaces that cannot be monitored. Precisely these pre-existing gaps are the central subject and theme of the series. By means of searching and accessing inadvertently unsecured CCTV cameras via the internet, blind spots were located and subsequently documented in the form of screenshots. The resulting images and compositions – which represent only a portion of an archive of over 300 screenshots created in the process – not only visualize the aforementioned paradox, but also put a visual spoke in the wheel of the continuum between the surveilled and the surveillant.

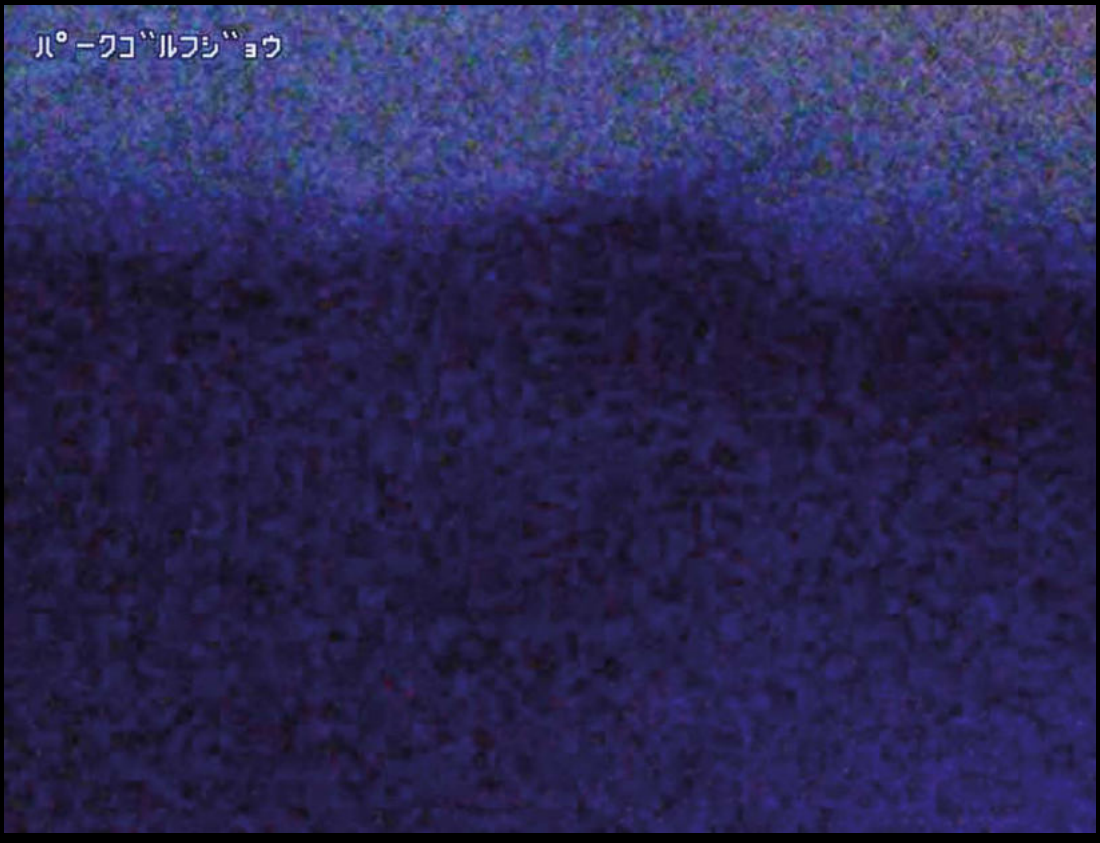









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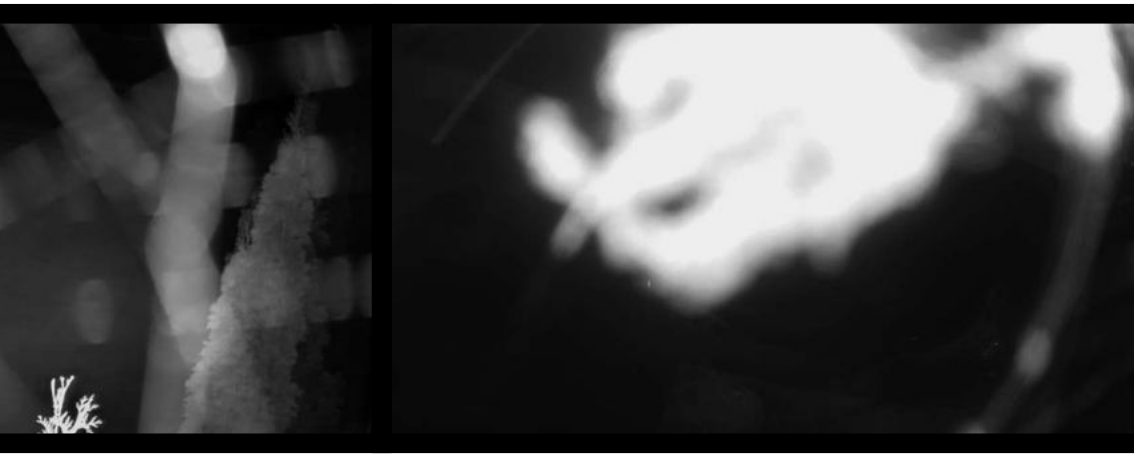

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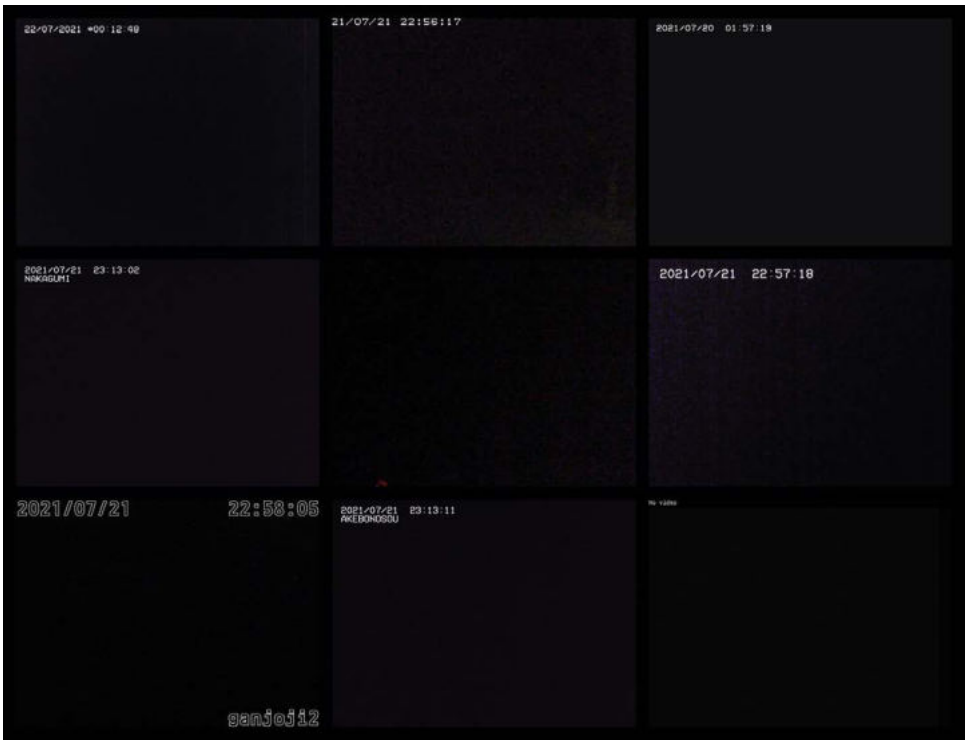

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A Case for Interface Studies: From Screenshots to Desktop / Screen Films

Jan Distelmeyer

I

Any discussion of screen images – at least in relation to computer screens – is necessarily a discussion of interfaces. And one of the greatest challenges involved in such a discussion is the question of precisely which forms of interfaces come into play and how. For this reason, the following considerations – which examine a broad range of screen images from screenshots and narrative films to documentaries and essayistic desktop / screen films – will start with some remarks on rather basic aspects of the interface complex.

Within the historical discourse on interfaces, it took some time to move away from a preoccupation with the human and the visual. Indeed, although the term interface was first introduced around 1870 by physicists James and William Thomson to describe conductivity and the transmission of energy, the everyday and professional use of the term in the second half of the 20th century tended to ignore its origin in technology, preferring instead to apply it to certain human-machine relationships.[1] In other words, interfaces became interfaces to computers and, more precisely, interfaces between humans and computers. The burgeoning use of the term interface in the realm of computer technology starting in the 1950s – initially focusing on physics and later more and more on systems and communication – paved the way, especially from the 1980s onwards, for a shift not only in everyday language but also towards an understanding of interfaces as primarily visual phenomena.[2] The introduction and enforcement of graphical user interfaces left a clear mark on the use of this concept, especially in the realm of media studies. As Florian Cramer and Matthew Fuller noted in 2008, these "symbolic handles" that "make

1 See: William Thomson: "Kinetic Theory of the Dissipation of Energy", in: *Nature* 9 (1874), pp. 441–444; Branden Hookway: *Interfaces*, Cambridge / Mass. 2014.

2 See: Hans Dieter Hellige: "Krisen- und Innovationsphasen in der Mensch-Computer-Interaktion", in: Hans Dieter Hellige (ed.): *Mensch-Computer-Interface. Zur Geschichte und Zukunft der Computerbedienung*, Bielefeld 2008, pp. 11–92.

software accessible to users" have been "often mistaken in media studies for 'interface' as a whole".[3]

In the 2010s, the complexity associated with the interface concept came more into focus, in particular due to the influence of software studies. As a result, the concept also became increasingly discussed in multilayered ways in media studies. The interface proved to be an interface complex. The multilayered nature of the concept stems from the fact that computers operate and function by having different layers of interfaces operating and functioning in mutual dependence. And in this context, (the enabling of) human activity comprises only one part of the interface activities.

For example, even the appearances and effects of those notorious "symbolic handles" – i. e., those operational images found on all sorts of screens and monitors – are dependent on and connected to other interface aspects and processes, such as hardware connecting humans / bodies to hardware, hardware connecting hardware to hardware, software connecting software to hardware, and software providing software-to-software connections.

However, in light of the increasing presence of sensing technologies – and specifically the growing prevalence of sensor-based computer forms capturing and exploiting the world through numerous hardware interfaces, such as microphones, cameras, motion sensors and many others – the interface layer of "hardware that connects users to hardware"[4] has now been extended to everything that no longer needs to make conscious use of this technology. Today, the former interface layer between hardware and "users" has become a part of those interface layers between hardware and the detectable, computable, and exploitable world.

Computers function by means of interfaces. More precisely, wherever computers are in operation, wherever they are networked with others and an outside world, interfaces are also in operation. Computing relies on interfacing. The 'internal telegraphy'[5] of the different computer forms (i. e., their inner processing of signals) and their expansion as external telegraphy (i. e., their interconnection as networks) are just as dependent on interface processes as all the connections to the part of the world that is supposed to provide input or be regulated / affected by output. Interfaces provide mediation processes for and as computer work.

[3] Florian Cramer and Matthew Fuller: "Interface", in: Matthew Fuller (ed.): *Software Studies: A Lexicon*, Cambridge / Mass. 2008, p. 149.

[4] Ibid.

[5] See: Hartmut Winkler: *Prozessieren. Die dritte, vernachlässigte Medienfunktion*, Paderborn 2015, pp. 278–282.

Dealing with interfaces therefore automatically means dealing with a complexity that makes computers work (in all their diverse, networked, and embedded forms).[6]

This interface complex is expanding at an incredible rate. Graphical user interfaces, voice user interfaces, as well as all the expanding and often inconspicuous sensors used in various forms of computerization (from smartphones and sensory street lamps in smart cities to the computer-based sensor technology of a "smart honey bee colony"[7]) all rely on an interface complex that includes not only the interface layers of a particular device, but increasingly the spreading interface layers of networked computing. In both technical and ideological terms, interfaces act as *conductors* of ongoing computerization.

The COVID-19 pandemic provided numerous examples of the increasing importance of interface levels. During the coronavirus crisis, sensing technologies were used worldwide and proactively starting in March 2020. Various democratic states – such as Poland with the "Kwarantanna Domowa" app[8] and Taiwan with the "Digital Fence" system[9] – secured access to the smartphone data of their citizens and reacted to the crisis by instituting measures designed to collect and monitor them. In Germany, citizens were encouraged to use the "Corona-Warn-App" which had been developed on behalf of the German government. This software uses the Bluetooth interface of smartphones not to record location data or movement profiles (tracking), but instead to reconstruct possible contact with infected persons (tracing). Smartphones and the interfaces that make them work, usable, networked and detectable are thus becoming a key technology for existential questions of health, government, and democracy.[10]

6 See: Jan Distelmeyer: "Drawing Connections. How Interfaces Matter", in: *Interface Critique Journal* 1 (2018), pp. 27–28 and Jan Distelmeyer: *Kritik der Digitalität*, Wiesbaden 2021, pp. 53–60. [English translation forthcoming under the title *Critique of Digitality*.]

7 See: Institute of Biology & Artificial Life Lab: *Futuristic Beehives*, no date, https://www.hiveopolis.eu/ (last seen: August 20, 2020).

8 Aleksandra Bartoszko: "Accelerating Curve of Anxiousness. How a Governmental Quarantine-App Feeds Society with Bugs", in: *Journal of Extreme Anthropology* 4/1 (2020), https://doi.org/10.5617.7861 (last seen: Aug. 20, 2020).

9 Audrey Tang: "The use of the Digital Fence system is a crucial part of Taiwan's current epidemic prevention measures", in: *Foundation for Strategic Research*, April 14, 2020, https://www.frstrategie.org/sites/default/files/documents/publications/autres/2020/Interview%20Audrey%20Tang.pdf (last seen: August 20, 2020).

10 One very promising research project (especially for concrete functions and effects of interfaces) is an international initiative by protagonists of multi-situated app studies, which was launched in summer 2020, "to investigate COVID-19 apps as media ecological artefacts", https://warwick.ac.uk/fac/cross_fac/cim/research/covid-19-app-store-and-data-flow-ecologies/ (last seen: August 20, 2020).

In other words, interfaces are key to the functionality, dissemination, autonomization and mode of appearance of computation. They bring about a challenging simultaneity of highly effective modes of both exhibited and unobservable power. As the obvious presence and handling of computers and their operational images continues to grow – a development made particularly visible thanks to the spread of mobile computers, including smartphones – so, too, does the implementation of comparatively hidden processes of sensing, calculation, and conduction increase (especially in relation to smart cities, an Internet of things, and machine learning), which are seen as "seemingly autonomous agents"[11] and interpreted as the "becoming environmental of computation".[12]

This is precisely why the term interface is so fruitful today. Its history and complexity make it possible to address a variety of efficacious operations ranging from the material basis of all sorts of computers and networks to the educational, epistemological, and ideological guidance by user interfaces showing and suggesting to humans what they should do. In media studies and related fields, the growing interest in interface analysis and interface critique can be understood as the development of a new and still evolving sub-discipline: interface studies.[13]

Since interfaces are both the technical basis for computer technology and an ideological basis for understanding what humans can actually do with a computer, interface studies can have various starting points and perspectives. What these perspectives have in common is an interest in the interlocking layers of interfaces that enable the actual functioning and / or appearance of the respective interface operations. In short, interface studies are driven by a preoccupation with the processes that make computers and their networks and sensors work, that make them available for human input and comprehension, and that make them imperceptible without reducing their efficacy and influence.

[11] Jennifer Gabrys: *Program Earth: Environmental Sensing Technology and the Making of a Computational Planet*, Minneapolis 2016, p. 65.

[12] Ibid., p. 4.

[13] This broader development includes, among others: Christian Ulrik Andersen and Søren Pold (ed.): *Interface Criticism. Aesthetics Beyond Buttons*, Aarhus 2012; Alexander R. Galloway: *The Interface Effect*, Cambridge / Mass. 2012; Johanna Drucker: *Graphesis: Visual Forms of Knowledge Production*, Cambridge / Mass. 2014; Lori Emerson: *Reading Writing Interfaces: From the Digital to the Bookbound*, Minneapolis 2014; Florian Hadler and Joachim Haupts (ed.): *Interface Critique*, Berlin 2016; Jan Distelmeyer: *Machtzeichen. Anordnungen des Computers*, Berlin 2017; Christoph Ernst and Jens Schröter (ed.): *Medien, Interfaces und Implizites Wissen* (*Navigationen* 17/2), Siegen 2017; Florian Hadler, Alice Soiné and Daniel Irrgang (ed.): *Interface Critique Journal* 1 + 2 (2018 + 2019); Carolin Gerlitz et al. (ed.): *Apps and Infrastructures* (*Computational Culture* 7), 2019/20, computationalculture.net/issue-seven/ (last seen: August 20, 2020); Jan Distelmeyer: *Kritik der Digitalität,* op. cit.

Interface studies ask to what extent an interface is "not a thing" but rather "an effect" and a process.[14] Interface studies explore the various modes of interfacing. Interface studies investigate how user interfaces "produce 'users' – one and all".[15] Interface studies analyze how interfaces perform conduction – both in terms of the physical meaning of transmission (of energy) and in terms of social and ideological guidance.[16] Interface studies examine the fact that although interfaces "may seem to evade perception, and become global (everywhere) and generalized (in everything)", they are still bound to hidden materiality and processuality, to a "metainterface to the displaced interface".[17] Interface studies explore "whether apps broker data permissions differently depending on the relationship between the app and the API [application programming interface] or the app and the user interface".[18] Interface studies take into account the fact that "planetary-scale computation",[19] the new ecology of computer technology, is driven by energy consumption and waste production, both of which are part of the ecology of interfaces.[20]

II

It is easy to see why screenshots are particularly interesting in the context of this analytical approach to interfaces, as they exemplify the curious condition of showing something that is no longer available. Indeed, screenshots present computer-generated images of computer-generated operational images that are no longer operational.

[14] Galloway: *The Interface Effect,* op. cit., p. 36.
[15] Wendy Hui Kyong Chun: *Programmed Visions. Software and Memory*, Cambridge / Mass. 2013, p. 67.
[16] See Jan Distelmeyer: "Taking Part. Two Steps Towards Networked Computerization," *Interface Critique Journal* 2 (2019), pp. 225– 233 and Distelmeyer: *Kritik der Digitalität,* op. cit., pp. 53– 86.
[17] Christian Ulrik Andersen and Søren Pold: *The Metainterface. The Art of Platforms, Cities and Clouds,* Cambridge / Mass. 2018, p. 10.
[18] Esther Weltevrede and Fieke Jansen: "Infrastructures of Intimate Data: Mapping the Inbound and Outbound Data Flows of Dating Apps", in: *Computational Culture* 7, 2019/20, http://computationalculture.net/infrastructures-of-intimate-data-mapping-the-inbound-and-outbound-data-flows-of-dating-apps/ (last seen: August 20, 2020).
[19] Benjamin Bratton: *The Stack: On Software and Sovereignty,* Cambridge / Mass. 2016.
[20] For artistic research on the connection between interfaces, Internet materiality, CO2, and domesticated electricity see the work of Joana Moll (http://www.janavirgin.com/index.html (last seen: August 20, 2020).

Drawing on a term coined by Harun Farocki to describe the production of imagery by machines for machines, an "operational image"[21] refers to processes that are not fully represented by such images (pictures and signs), but rather of which operational images themselves are constitutive parts. As Volker Pantenburg explained with regard to Farocki's concept, these images are "completely absorbed into the process of the respective operation. They aren't intended to be released separately, and strictly speaking don't need to appear as images at all but emerge as the intermediate product of a wider technical process".[22] What distinguishes my perspective on operational images from Farocki's approach, though, is my concentration on the computer generated images of an "interface mise-en-scène" offered to humans as a way to handle and grasp computers.[23]

Consequently, the processes addressed as operational are as multi-layered as the interface complex: It concerns both the operations of machines (the internal and external telegraphy of computers) and my operations (technical, physical, and cognitive processes) of dealing with them. The operational purposes, for which this imagery of an interface mise-en-scène is created, include the operations of computers, with which the clickable or touchable signs and images are indexically[24] connected, as well as the operations of my body, with which I operate a computer by handling operational images, among other things.

Against this background, the screenshot represents a moment of both capturing and cutting at the same time. Although "the screenshot 'grabs' [...] the visual data displayed on the screen at a particular moment",[25] because it "is written from the video RAM as a copy into the main memory or immediately as a file with corresponding metadata on

[21] Translating the German term "operative Bilder", Farocki uses "operative images" as well as "operational pictures" and "operational images" (see: Harun Farocki: "Phantom Images", in: *Public* 29 (2004), pp. 12–22 and http://www.harunfarocki.de/installations/2000s/2003/eye-machine-iii.html (last seen: August 20, 2020). I will use "operational images" here, which has become common in the international discourse on Farocki's work, to emphasize the actual (cultural and computational) efficacy of these images and signs (see: Christa Blümlinger: "An archaeologist of the present," *e-flux* 59, 2014, www.e-flux.com/journal/an- archaeologist-of-the-present/ (last seen: August 20, 2020); Trevor Paglen: "Operational Images", in: *e-flux* 59, 2014, https://www.e-flux.com/journal/59/61130/operational-images/ (last seen: August 20, 2020); Volker Pantenburg: "Working Images. Harun Farocki and the Operational Image," in: Jens Eder and Charlotte Klonk (ed.): *Image Operations. Visual Media and Political Conflict*, Manchester 2017, pp. 49–62.)

[22] Pantenburg, Volker: *Farocki / Godard. Film as Theory*, Amsterdam 2015, p. 210.

[23] See: Distelmeyer: *Machtzeichen. Anordnungen des Computers,* op. cit., pp. 92– 98.

[24] See: Marianne van den Boomen: *Transcoding the Digital. How Metaphors Matter in New Media*, Amsterdam 2014, pp. 27–47.

[25] Frosh, Paul: *The Poetics of Digital Media*, Cambridge / UK, Medford 2019, p. 78.

a data storage",[26] the screenshot cuts off the operativity of the captured operational images. The screenshot as a "somewhat paradoxical object"[27] is still a "digital object",[28] still computer generated and appearing on a screen, but its special camera-less photo-quality erases the very operations that these images usually enable.

As Winfried Gerling emphasized in his historicization of screenshots in the double-tracked tradition of the "Schirmbild" and camera-less photography, the screenshot provides an image of a user interface that does not visually differ from its appearance as an operational interface mise-en-scène.[29] It is precisely this quasi-frozen, captured or, as Paul Frosh nuanced, "grabbed"[30] similarity that may lead to confusion (mistaking the screenshot for the screen) and can also be taken as an opportunity to reflect on these appearances anew.

As a case for interface studies, the screenshot is, on the one hand, an invitation to think about the disappeared operativity and its conditions, concealment, and effects. On the other hand, the disconnected operativity is a chance to reconsider these signs and images no longer as being just tools, which Søren Pold criticized as "functional realism",[31] but to analyze them as cultural products with far-reaching aesthetical, epistemological, and ideological qualities. How both aspects of this particular figurative quality interact constitutes the complexity of operational images as the executive blockbusters of computerization.

The ability to *de-operatize* operational images as an interception of "the ever-changing fluctuations of contemporary screens"[32] distinguishes the screenshot from its technical extension to moving image (video) and sound, otherwise known as the screencast. The temporality of capturing or grabbing, which enables the recording of movements and thus of changes, makes screencasts, as Richard Rogers has pointed out, an

[26] Winfried Gerling, Susanne Holschbach and Petra Löffler: *Bilder verteilen – Fotografische Praktiken in der digitalen Kultur*, Bielefeld 2018, p. 150 [translation by JD].

[27] Frosh: *The Poetics of Digital Media*, op. cit., p. 66.

[28] With reference to Yuk Hui, I understand digital objects in this context as materialized forms of a large amount of "data and metadata, which embody the objects with which we are interacting, and with which machines are simultaneously operating". (Yuk Hui: *On the Existence of Digital Objects*, Minneapolis 2016, p. 48).

[29] Gerling, Holschbach and Löffler: *Bilder verteilen*, op. cit., pp. 145–150.

[30] Frosh: *The Poetics of Digital Media*, op. cit., p. 77.

[31] Søren Bro Pold: "Interface Realisms: The Interface as Aesthetic Form", in: *Postmodern Culture* 15/2 (2005), http://pmc.iath.virginia.edu/text-only/issue.105/15.2pold.txt (last seen: Aug. 20, 2020).

[32] Frosh: *The Poetics of Digital Media*, op. cit., p. 78.

important "digital method" for documenting, for example, the history of a web page.[33]

Since the launch of YouTube in 2005, "Let's Play" videos, which document playthroughs of computer games, have become the most popular form of screencast.[34] However, since the mid-2010s, screencasts have enjoyed yet another form of attention. Labeled first as desktop films or desktop movies and later as screen films or computer screen films, there emerged a range of feature-length motion pictures, short films, documentaries, and video essays that focused on the audiovisual on-screen presentation of personal computers, laptops, tablets, and smartphones as a way of telling stories and reflecting on the world as it appears and transforms through computer use. In other words, these films not only provide highly interesting material for analysis and reflection in the broader field of interface studies, they themselves can also be results and events of a related type of studies.

III

Everything that happens in these films takes place on the screen of a computer. Desktop films – or, more precisely, desktop / screen films, given that they increasingly operate not only within desktop environments but also with various user interfaces associated with tablets and smartphones – deal with the world by means of programs and interfaces that are part of everyday life when dealing with computers. At the beginning of this international movement were, for example, the short films Internet Story (2010, Adam Butcher) and Noah (2013, Walter Woodman & Patrick Cederberg), the video Grosse Fatigue (2013) by the artist Camille Henrot, the video essays Apple Computers (2013, Nick Briz) and Tr@n$form3r$: The Premake (2014, Kevin B. Lee) as well as the feature-length motion pictures the den (2013, Zachary Donohue), Open Windows (2014, Nacho Vigalondo) and Unfriended (2014, Levan Gabriadze). They all follow a concept of concentration, namely that the limits and conditions of user interfaces define what works.

Desktop / screen films narrate, depict, and explore reality by working with the means that computers provide us with. In this realm, the act

[33] Richard Rogers: *Doing Digital Methods*, Los Angeles 2019, pp. 87–105.

[34] See: Harrison Jacobs: "Here's why PewDiePie and other 'Let's Play' YouTube stars are so popular", in: *Business Insider*, May 13, 2015, https://www.businessinsider.com/why-lets-play-videos-are-so-popular-2015-5?r=DE&IR=T (last seen: August 20, 2020).

of dealing with what the world can be for us always means dealing with what is envisaged by programming and hardware. This is precisely the attraction and provocation of these films: The world here is reduced to what is possible with a computer. Desktop / screen films display and demonstrate the operational images of computer user interfaces. Like screenshots, they deprive the interface mise-en-scène of its operability. But since these films show the consequences of interface operations, this is less about standstill than about a limited re-enactment: They turn operational images into images of operations.

Everything that appears on the screen is contingent on an operating system. Programs present audiovisual activities on and with websites, videos, music, chats, and other software. The sound of these films is also processed; data flow for the speakers. Sometimes, in addition to the sounds of Spotify, YouTube or Skype, for example, the handling of the hardware can also be heard, such as the clicking of a mouse and the rattling of the keyboard. Acoustically, the limit of the screen is partially exceeded.

In Noah, for example, this begins with entering a password so that the (online) fate of the title character can take its course. In the windows on Noah's computer, Skype conversations, Facebook posts and short messages from his girlfriend Amy lead to an unwanted break-up that follows its own dynamic. It comes true before it actually happens by changing the status on Facebook from "in a relationship" to "single". Predictive interfacing.[35]

While Noah zooms, pans, and cuts within the desktop, unfriended remains in full view of the entire desktop. Thus, in the distance shot and the permanent simultaneity of interface operations and appearances, Unfriended unfolds its horror story around the student Laura Barns, whose suicide, documented on YouTube, becomes the starting point for a techno-ghostly vendetta. We follow it on the desktop of Laura's friend Blaire. The switching between YouTube, Facebook, iMessage and, most importantly, Skype conferences with Blaire and her friends unfold the background and further development of the plot. So the doubled flexibility (the multitasking of the machine and its user) is constantly in the picture.

At the same time, these program-changes soon show the supernatural presence of a ghostly user, billie227, who invisibly and uncannily drives the action. This magical force is manifested in unfriended through visual and prevented activities: it posts on Facebook, sends text messages,

[35] See: Patrick Cederberg: *Noah*, https://vimeo.com/65935223 (last seen: February 15, 2020).

cannot be removed from Skype conferences, confronts the group with their guilt, puts pressure on them and then assassinates them one by one. Skype supplies (disturbed) pictures and sounds to this. This app is the key software of this film because it displays and establishes presence and connection.

A different form of networking and a different way of coping with it can be witnessed in Tr@n$form3r$: The Premake. This video essay by Kevin B. Lee works as a "desktop documentary" in at least two main directions: First, it shows the distribution of videos that were released – especially by fans – during the shooting of Transformers: Age of Extinction (2014, Michael Bay). Secondly, it examines the relationship of the videos to the production and PR process of this international blockbuster.[36]

"Desktop documentary", as Lee explains with regard to the history of the genre and his own approach to it, "is an emerging form of filmmaking developed at the School of the Art Institute of Chicago by faculty artists such as Nick Briz, Jon Satrom and Jon Cates, and students such as myself, Yuan Zheng and Blair Bogin. This form of filmmaking treats the computer screen as both a camera lens and a canvas, tapping into its potential as an artistic medium. If the documentary genre is meant to capture life's reality, then desktop recording acknowledges that computer screens and the internet are now a primary experience of our daily lives, as well as a primary repository of information. Desktop documentary seeks to both depict and question the ways we explore the world through the computer screen".[37]

In this sense, Tr@n$form3r$: The Premake responds to the blockbuster principle of expansion, which led Transformers: Age of Extinction to several locations in China, with compression. The first appearance of the browser window is therefore also the moment in which a zoom concentrates on the search line of YouTube and then on the results of the search for "transformers 4". From this point on, the virtual camera that captures these desktop events will stay in motion, moving in and out of websites, videos, texts and maps, deepening, gaining and losing an overview.

Pictures, words, and signs stand, run and sound next to and above each other. The gaze sinks into a YouTube video, only to zoom out again afterwards in Google Maps. Under a fan-video at the Transformers-set, a text about the sociologist Tiziana Terranova is marked on another web-

[36] See: Lee, Kevin B.: *Transformers. The Premake*, https://www.alsolikelife.com/transformers-the-premake (last seen: August 20, 2020).

[37] Ibid.

site. A matter of free labor: "According to Tiziana Terranova, the cultural power of media uses the Internet to be a site of free labour to promote any type of media product want to advertise".

The concept of Tr@n$form3r$: The Premake is oriented towards such relations of culture, market, and power (and "users") and develops its own aesthetics from out of these. The global and local questions (e. g., what happens at and with the locations in China and the USA?) are "glocalized" here on the desktop by opening windows on the limited surface of the networked computer, which all lead to the World Wide Web. In the end, about 50 browser windows open one after the other, and above that another roughly 200 video files, which overload the computer to such an extent that nothing moves except the waiting and spinning cursor. A logical consequence: The system the film belongs to and to which it wants to react is spinning out of control.

IV

Considering the importance and multilayered nature of the interface complex, the potential of desktop / screen films lies especially in their ability to offer a new relationship to the apparatuses, programs, networks, and habits with which we regulate our lives and allow our lives to be regulated. Beyond what can be observed as human activity on screens, we encounter in a different way those processes whose raw materials, rules, and systematic procedures we permanently rely on.

Louis Henderson's desktop video essay All That is Solid (2014) makes suggestions in this regard by drawing analogies between gold mining and computer recycling in West Africa using the example of the Agbogbloshie electronic waste ground in Accra and illegal gold mines of Ghana. "In effect", summarizes Sara Magno in her detailed analysis of All That is Solid, "this desktop documentary uses the computer not only as the apparatus through which the film is composed, but the setting for the story to unfold, a story that reflects back on the materiality of the desktop itself".[38]

Even Unfriended has something to contribute here; especially in those moments when the supernatural threat of the ghostly user begins to reveal itself in a literally *programmatic* way (i. e., based on basic programmability as well as realizing and executing specific programs). Just

[38] Sara Magno: "Narrative and database in 'All that is Solid', a desktop documentary", *Galaxia* 41 (2019), pp. 14–30, here p. 16.

as at that point of culmination when the "disconnect call" button in the Skype menu disappears in an inexplicable way. Common, reliable actions in and with user interfaces of certain programs are suddenly somehow mysteriously – a magical form of hidden programming – blocked. These programmatic problems in the user interface remind us of the fact that everything that should be possible as an interaction with computers has to have been exactly defined by programming beforehand.

The corresponding power relations of human-computer interaction are exhibited in this sense as an interface appearance: "There is no button". – "What do you mean?" – "There's no button to hang up on him". The almighty ghostly user, the devil from the machine, has already typed the appropriate comment into the chat: "problem, guys?" It is precisely this resistance in data flow, this operational disturbance, that can show in a new, close and yet distanced way the present in and with which we live as "users".

The operational disturbance in Unfriended is followed by the emotional disturbance in Searching (2018, Aneesh Chaganty), which like Unfriended and its sequel Unfriended: Dark Web (2018, Stephen Susco) was produced by Timur Bekmambetov. Searching follows the desperate quest of a father for his missing daughter. Keeping within the boundaries of a desktop / screen film, the seeking father not only finds his daughter by performing research on the Internet and gathering personal data on computers and platforms – he also truly gets to know her for the first time.

The disturbing thing about searching is thus the ultimately confirmed logic of the platform economy, which holds that essential values can and should be derived from data traces and online traffic. searching makes the zoom into the events on the used and investigated monitors a central stylistic device and never distances itself from the content either. Instead, it deepens the logic of the data values and zooms into platform and capture capitalism.[39]

With regard to the relationship between distance and proximity, the opposite is offered by the video essay Watching The Pain of Others (2018) by Chloé Galibert-Laîné, whose previous work, My Crush was a Superstar (2017), depicted a personal and hyper-analytical desktop search for a representative of ISIS recruits – a narrated and self-reflexive

[39] See: Nick Srnicek: *Platform Capitalism*, Cambridge 2017; Till A. Heilmann: "Datenarbeit im 'Capture'-Kapitalismus. Zur Ausweitung der Verwertungszone im Zeitalter informatischer Überwachung", in: *Zeitschrift für Medienwissenschaft* 13 (2015), pp. 35–47.

data stream of online research.[40] In Watching the Pain of Others, online presence and physicality, platform logic and skin disease become closely related, asking on Chloé Galibert-Laîné's desktop how the one might affect the other. Without ignoring or betraying one part of reality for the other, Watching The Pain of Others explores human-machine relationships in and with their networks in a personal-technical way.[41]

This intensive and (in a physical and cognitive sense) unsettling relationship is enriched by Chloé Galibert-Laîné's Forensickness (2020) – a "desktop diary inspired by Chris Kennedy's *Watching the Detective*"[42] – to a new level. Forensickness takes Chris Kennedy's film Watching the Detectives (2017), which explores the social media speculations surrounding the perpetrators of the Boston Marathon bombing in April 2013, as an opportunity to question the search for and production of visual evidence by means of interface operations. Procedures of research and agitation are shown as interface effects, which is not without consequences for the self-doubt of this desktop movie. Thus Forensickness intensifies the personal-technical approach of Watching The Pain of Others by investigating strategies of cogency. Here, too, Chloé Galibert-Laîné's essay comes back to itself in order to understand its own (not only technical) entanglement.

By making parts of the presence of the computer the stage and resources of their events, these and other desktop / screen films, such as Zach Blas' desktop cycle Contra-Internet (2014–2018), open up the possibility of looking at this presence differently.[43] They encourage a perspective that questions and criticizes, for example, the tool status of user interfaces, that inquires into the hidden layers and processes of interfaces, that surveys the relationship between regulation, freedom, control, and networks and that links the question of materiality with it.

Whether through virtual pans, zooms, and invisible cuts or through the static overview of the distance shot, time and again, desktop / screen films establish relationships with computer relations, in which the cutoff proximity to everyday interface experiences allows a reflexive mixture of intimacy and alienation. In another sense, they can therefore offer

40 See: Chloe Galibert-Lâiné: *My Crush Was a Superstar*, https://www.chloegalibertlaine.com/my-crush-was-a-superstar-english (last seen: February 15, 2020).

41 See: Chloe Galibert-Lâiné: *Watching The Pain Of Others*, https://www.chloegalibertlaine.com/watching-the-pain-of-others (last seen: February 15, 2020).

42 Chloe Galibert-Lâiné: *Forensickness*, https://www.chloegalibertlaine.com/forensickness (last seen: August 20, 2020).

43 See: Zach Blas: *Contra-Internet*, https://zachblas.info/works/contra-internet/ (last seen: August 20, 2020).

something that user interfaces are also supposed to do, namely to provide and shape a certain mode of access. These films thus develop their own potential to explore parts of the complexity and depth in the field of interface studies.

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Salty Glitches

Till Rückwart

Salty Glitches is a project consisting of 6 images exploring the relationship between humans, technology and nature as revealed by digital errors. It highlights colorful misrepresentations in Google Earth's satellite imagery that emerge due to malfunctioning software. These glitches occur in the salt deserts of South America. They leave the spectator slightly irritated, yet in awe. While problematizing notions of truth in digital media, they also draw attention to the area they're located in: lithium mines in Chile's Atacama Desert and at the Caucharí-Olaroz project in Argentina.

By scanning QR codes coupled with the photographs, people can encounter the glitches on their own smartphone and become materially connected to the origin of the device's battery.

A glitch can be best described as an unintentional error produced by software. It offers the potential to reflect on the fault lines along which our digital society is constructed. In this way, the glitch helps us to better understand the technical logics of our media-saturated environments.

Salty Glitches also discloses how satellite imagery is produced. By examining the glitches, we get a vague idea of the complex apparatuses surveilling the Earth from orbit using multi-lense technology.

As a result of bug reports and updated photo material, these glitches quickly become outdated. Hence, the project is part of an ongoing process to document and emphasize these glitches in order to preserve how software continuously obfuscates our world and thus guides our worldview.





Salty Glitches 004, Jujuy, Argentina, 2021



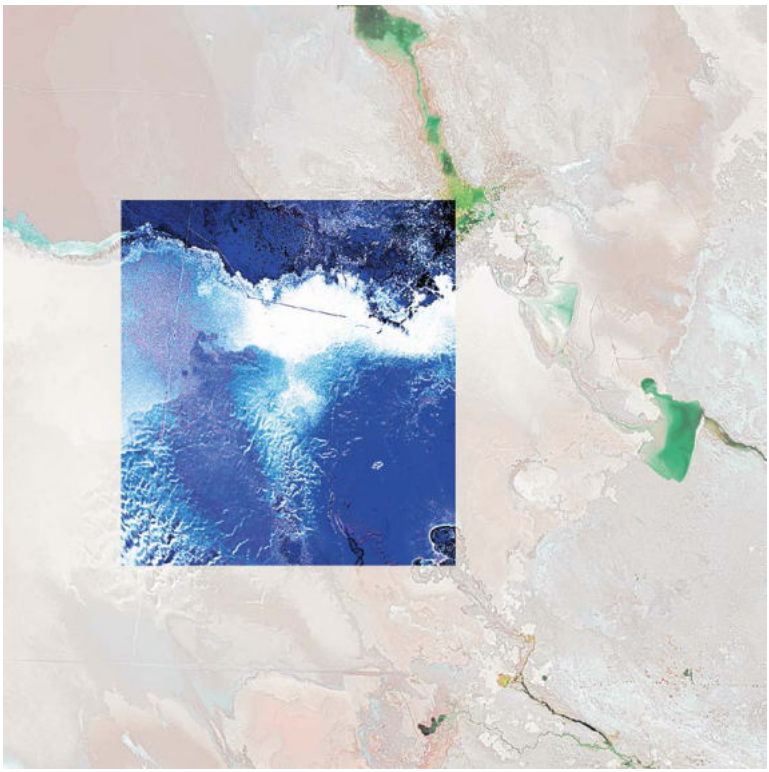


Salty Glitches 002,
Atacama Desert, Chile, 2021



Salty Glitches 001,
Jujuy, Argentina, 2021





Salty Glitches 006, Atacama Desert, Chile, 2021



Screencasting: Documenting Processuality

Julia Eckel

Intro

In discussions of screenshots, it is often stated that such digital images constitute a neglected subject – or at least that they represent a field of research that deserves much more attention. According to Paul Frosh, for example, "screenshots are largely neglected in public debate and scholarly research, despite the fact that they are everywhere put to work."[1] And Winfried Gerling states that screenshots are "an everyday activity that rarely receives attention in photographic debates."[2] What is true for the screenshot is all the more true for the screencast, that temporalized or filmic version of the screenshot, which shares a common trait with the photographic still image of a screen in the sense that it likewise remains conspicuously invisible in its use. Even if, as a rule, the primacy of transparency over opacity applies to media and their reception in general, what is special about screenshot and screencast is that they are medial forms of recording whose specific characteristics include the fact that what is recorded and what is recording do not appear to be medially (or technologically and / or materially) separable from one another; instead, they appear to be congruent, especially if one understands screenshot and screencast as practices of the digital.[3] Frosh therefore calls the screenshot "among the most transparent of digital phenomena,"[4] which Gerling, in turn, sees as justified due to the fact that it is "a 1:1 reproduction of the image that has been on the monitor,"[5] meaning that it is always already "an image of an image."[6] In this specific *twofold imagery*, it becomes visually indistinguishable and thus invisible.

1 Paul Frosh: *The Poetics of Digital Media*, Cambridge / UK, Medford 2019, p. 62.
2 Winfried Gerling: "Photography in the Digital. Screenshot and In-Game Photography", in: *Photographies* 11/2–3 (2018), pp. 149–167, here p. 149.
3 Screenshot and screencast will be considered in this text as primarily digital recording practices, i. e., as those that aim to record computer screens and are usually also reproduced on computer screens. In the following sections on the history of screencasting and on screencasting as historiography, however, analogue processes will also be addressed.
4 Frosh: *The Poetics of Digital Media*, op. cit., p. 63.
5 Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit., p. 162.
6 Ibid.

The consequence of this transparent nature of screengrabs (be they still or moving) as phenomena of primarily digital media cultures and objects of scholarly debate is that they are too easily overlooked. "[W]e almost exclusively *look through* screenshots to focus on what they depict, and almost never *look at* them to foreground how they operate," Frosh states.[7] And at the same time, this blindness towards screenshot and screencast as image operations has the effect that their own origination is usually not reconstructable. As Gerling notes: "The genesis of a screenshot is rarely documented."[8] The documentary quality of the still and moving screengrab thus lies in its appearance as an immediate or unmedialised 1:1 copy of an image event; and yet, for precisely this reason, it is all the less perceived as an event of image-making itself. While regular processes of recording produce a medial *break* or a noticeable, mostly material transformation between object and image or image and copy (e. g., a photograph of an oil painting or a videographed bootleg of a 35mm film projection), in the case of the digital screenshot and screencast these operations seem to fall into one. Due to this highly material identity, these image practices can hardly be traced or reconstructed in the material itself. The indexicality and iconicity of screen photos and screen videos thus seem to exceed that of conventional photography and live-action film techniques, because there is no difference between the original and the copy on the purely visual level of the screen.[9]

Nevertheless, there is one crucial trait that separates the digital "screen image," as Gerling[10] calls it, from the "image on the screen" documented in it and which – despite all the analogies outlined – also marks the decisive distinguishing feature between screenshot and screencast: their interactivity or non-interactivity. Thus, within the

7 Frosh: *The Poetics of Digital Media*, op. cit., p. 62.

8 Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit., p. 162.

9 Gerling sees this characteristic as a unique selling point of the screenshot when he writes: "The screenshot is possibly the only image of a thing that could be confused with it, at least for a short time. Robbed of the operativity of the interface image, the screenshot, like a photogram, is only a shadow of what it portrays." (ibid., p. 160) And he continues: "This distinction becomes especially clear when a computer user tries to operate within the screenshot as if in an interface, because the two are easily confused. If the screen is filled with the screenshot of the previous status of the screen, the difference only becomes apparent when attempting to operate within the screenshot. The screenshot is taken as reality – that has been – on the computer screen (and pixel-precise). It is a strange confusion with reality that could never occur in photographs. The latter were only confused with nature early on; otherwise the photograph has always been understood as a representation" (ibid., p. 157).

10 Ibid., p. 150.

theoretical discourse, which is often conducted primarily in terms of photography theory, the screenshot is seen as a medium that is able to break the fluidity and ephemerality of digital, interaction-based image environments[11] by stopping the stream of images and by setting cuts[12] both on the level of space[13] and, above all, time. Likewise, the defining difference between the screenshot as a singular image and the screencast as a series of images is to be found regarding their characteristic temporality; indeed, while the "shot" immobilizes time, the "cast" makes it permanent. With reference to Bazin, one could say that the shot is an image that shows "the object freed from the conditions of time and space that govern it" and thus "embalms time,"[14] while the cast is an "image of [...] duration," and thus depicts "change mummified as it were."[15]

The distinction between screenshot and screencast is thus that the former appears as a remediation of photography,[16] while the latter manifests itself as a moving image and, in doing so, resembles film and television. "Shot" and "cast" are, in this sense, as fundamentally medially different as photography and film, and accordingly their functions differ, especially with regard to the phenomenon of interactivity, which appears in them as "depresented" – as Distelmeyer calls it, drawing on van den Boomen.[17] While the "shot" of a computer screen stops time

[11] See Lev Manovich: *The Language of New Media*, Cambridge / Mass. 2001, pp. 94–102.

[12] See Frosh: *The Poetics of Digital Media*, op. cit., pp. 78–80 and Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit., p. 150.

[13] Frosh, for example, emphasizes the frame as a particular spatial boundary of the screenshot, although it is often identical to the frame of the interactive screen that is being depicted. Rothöhler therefore states (with regard to desktop documentaries as a specific form of screencasting) that the screen in this cinematic format is "the definitive outer limit of framing." (Simon Rothöhler: "Filmkolumne: Desktop-Arbeit", in: *Merkur* 68/784 (2014), pp. 812–116., here p. 814; transl. J. E. See also Jan Distelmeyer: "Durch und über Computer: Desktop-Filme," in: Martin Doll (ed.): *Cutting Edge! Aktuelle Positionen der Filmmontage*, Berlin 2019, pp. 193–210, here p. 206.)

[14] André Bazin: "The Ontology of the Photographic Image", in: *Film Quarterly* 13/4, (Summer 1960 [1958]), pp. 4–9, here p. 8. See also Frosh: *The Poetics of Digital Media*, op. cit., p. 76.

[15] Bazin: "The Ontology of the Photographic Image", in: *Film Quarterly* 13/4, op. cit., p. 8.

[16] See, again, Frosh: *The Poetics of Digital Media*, op. cit., pp. 74–76.

[17] See Distelmeyer: "Durch und über Computer", in: Doll (ed.): *Cutting Edge! Aktuelle Positionen der Filmmontage,* op. cit., p. 214. Distelmeyer refers here to the fact that the computer screen, as a visual surface, always already obscures the processes that it is actually based on by indicating that operations are taking place, but that they are concealed rather than revealed by the visualization. Thus, it is a kind of *non-presenting presence*, i. e., a "depresentation" of these underlying processes, as Marianne van den Boomen describes it in relation to desktop icons and as Distelmeyer applies it to desktop films: "[T]he icons on our desktops do their work by representing an ontologized entity, while depresenting the processual and material complexity involved. This is the way icons manage computer

and thus fundamentally prevents and excludes succession as a condition for potential interactions, its "casting" as a permanent recording enables the documentation of the interactivity that takes place *on the screen* over time. Although factual interaction is also prevented in the reproduction, the quality of the screencast nevertheless consists in being able to document these interactive moments – between user and machine or machine and machine – in their flow and their visual specificity.

If Frosh emphasizes the stillness of the screenshot as a remediation of the photographic and as a documentary incision in the calculated visual flow of digital interactive (image) environments, and if this stillness is what gives the screenshot its special quality (as a document), then the following question remains: What specifies the screencast if it refuses this stillness by setting cuts sequentially, that is, by cutting out time spans instead of moments.

The visibility of interactivity or image operations in stills is therefore different from the visibility they have in the moving image. This is where I would like to start my investigation of the screencast and ask what added value screen recordings have vis-à-vis the documentability of interactivity.

Screencasts as Documentations: Storing, Transmitting, Processing

Friedrich Kittler has stated that the central characteristics of mediality can be reduced to three core functions: storing, transmitting and processing.[18]

complexity, this is the task we as users (in tacit conjunction with designers) have delegated to them." (Marianne van den Boomen: *Transcoding the Digital. How Metaphors Matter in New Media*, Amsterdam 2014, p. 36.)

[18] Friedrich Kittler: *Draculas Vermächtnis. Technische Schriften*. Leipzig 1993, p. 8. In this book, Kittler speaks of "Übertragung, Speicherung, Verarbeitung von Information" (p. 8; transl.: transmission, storage, processing of information) as well as of "Speichern, Übertragen, Berechnen" (p. 65; transl.: storing, transmitting, calculating). Looking at English texts resp. translations of Kittler's writings, one finds an article named *The City Is a Medium* in which he elaborates on these operations as well and a bit more extensively: "MEDIA record, transmit and process information – this is the most elementary definition of media. Media can include old-fashioned things like books, familiar things like the city and newer inventions like the computer. It was von Neumann's computer architecture that technically implemented this definition for the first time in history (or as its end). A microprocessor contains a processor, the memory and buses, not just in addition to something else, but exclusively. The processor carries out logical or arithmetical commands, according to the parameters set up in the memory; the buses transmit commands, addresses, and data based on the parameters of the processor and its most recent command; the memory ultimately makes it possible to read commands or data at precise addresses or to encode them. This network of processing, transmission, and recording, or restated: of commands, addresses,

With regard to screencasts and their potential to record interactivity or interfaces in action, this triad seems to be a productive starting point, not least because these operations refer directly to the documentary potential contained in digital media and media in general.

If we look at the academic discourse on the screen image, these operations can also be found explicitly in Gerling's considerations when he states: "First and foremost, the screenshot is documentation and serves to communicate and archive images of a computer's use."[19] The screen photo thus seems to be booked on the first two media functions, *storing* ("archive") and *transmitting* ("communicate") information. But what about the level of processing? In his book of the same name, Hartmut Winkler conceives of "Prozessieren" ("processing") as the "third and neglected media function"[20] and thus points to the fact that processing is often not adequately taken into account in the consideration of media.[21] Is Gerling's description thus a case of neglecting this media operation of calculating, transforming and processing? On closer inspection of the sentence, processing is present in the notion of the "computer's use." This means that the screenshot, as a documentary medium, would be responsible for storing and transmitting (in an active sense) the processing (in a passive sense). At the same time, however – and this brings me back to the *invisibility*[22] of screen images as operations outlined above – screenshot

and data, can calculate everything (based on Turing's famous proof from 1936) that is calculable. The development of technologic media – from digital transmission media, like the telegraph, to analog recording media, like gramophone and film, and to the media for their transmission, radio and television – comes logically full circle. Other media can, likewise, be transferred to the discrete universal machine." (Friedrich Kittler: "The City Is a Medium" (transl. by Matthew Griffin), in: *New Literary History* 27/4 (Autumn 1996), pp. 717–729, here p. 722.)

19 Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit., p. 156.

20 Hartmut Winkler: *Prozessieren. Die dritte vernachlässigte Medienfunktion*, Paderborn 2015. For an English synopsis of some of the main arguments of the book, see Hartmut Winkler: "Processing the third and neglected media function," a presentation at the conference "Media Theory in North America and German-Speaking Europe" held at the University of British Columbia, Vancouver, April 8–10, 2010, http://homepages.uni-paderborn.de/winkler/proc_e.pdf (last seen: July 17, 2021).

21 Central starting point of Winkler's reflections is that Kittler's triad of storing, transmitting and processing applies not only – as is often assumed – to the computer as a universal machine, but to media of all kinds (see Winkler: *Prozessieren*, op. cit., pp. 9–10), which raises the question of what these processuations look like outside the computer. As Kittler states (see footnote 18), the computer is virtually only the machine in which these three functions are technically most impressively or explicitly combined (via processor, memory and data buses) (see also footnote 22).

22 With regard to Winkler's observation of a media-theoretical neglect of processing as the third media function, an interesting parallel to the description of a media-theoretical neglect (and thus invisibility) of screenshot and screencast outlined at the beginning of this article can be noted when Winkler begins his book with the following words: "Friedrich

and screencast can, of course, themselves be seen as a certain form of processing in which the processuality of interfaces is transformed into another form – the *photographic* and the *cinematographic* – which goes hand in hand with a different mediality. The fact that you cannot click, scroll, swipe, etc. in screenshots and screencasts is the crucial point in this respect; only in a second step is it about the superficial recording of visual interactivity becoming storable and transferable. What characterizes the mediality of screenshot and screencast is thus a *twofold processuality* (in both the active and passive sense). But while the screenshot immobilizes this processuality in the image and removes it from time, it becomes more clearly visible in the screencast through its temporal fluidity. This is where I would establish the decisive difference: the screencast is *the* medium for documenting processuality because it not only makes it the object of storage and transmission, but at the same time and nevertheless reperforms it in the image.

Winkler's discussion of Kittler's triad is also an ideal backdrop to this thesis, because Winkler ties the mediality based on transmission, storage and processing back to a specific negotiation of time and space (which links these ideas to the already mentioned definition of the screenshot as a "cut" in the spatiotemporally fluid continuum of the screen surface). According to Winkler, media can be defined as such because they shift signs spatially and temporally; that is, they engage in processing.[23] Parallel to that, the three media functions feature an individual competence with regard to space and time: storage bridges time, transmission bridges space[24] and processing consists of "operations in space and time,"[25] thus allowing for equally temporal and spatial or spatiotemporal transformations. "Memory, as a technique of immobilization, stands against time. By contrast, processing brings transformation, change and innovation

Kittler, probably the best-known representative of German media theory, said that there are three basic media functions: transmitting, storing and processing. The first two are indisputable; *transmission* means communication and telecommunication, the ability of media to overcome spatial distances. The second dimension, *storage*, stands for the overcoming of time, for the formation of tradition and cultural continuity. An almost incalculable amount of work has been done on both within Media Studies. But what about the third media function, processing? First of all, it is striking that there are far fewer studies, theories and ideas in this field." (Winkler: *Prozessieren*, op. cit., p. 9; transl. J. E.) Screenshot and screencast also seem to become (theoretically and practically) invisible as processes and processings in this sense, given the dominance of transmission and storage that is exhibited in them. My thesis, however, would be that the screencast explicitly reflects this neglect of its processing, which makes it particularly interesting in terms of media theory.

23 Ibid., p. 13.

24 Ibid., p. 9.

25 Ibid., p. 13; transl. J. E.

into view," Winkler writes.[26] So, if the screenshot is the medium of immobilization and thus of storage, then the specific medial and documentary quality of the screencast is that in its own processing, storage and transmission it nevertheless enhances the visibility of processing – as a key category rather than a neglected one. While the screenshot transforms the spatiotemporal structure of the computer screen insofar as it immobilizes it and thus, in fixing a spatial arrangement, elevates it above time (the processual event becomes storable and transferable), the screencast opens up the possibility of not only storing and transferring, but also of keeping processing itself present in this "spatiotemporal displacement," in Winkler's sense.

The nature of the screencast – as a *procedural document* of a *procedural mediality* – is thus that it not only stores and transmits, but also (re)performs processes. In doing so, it becomes a documentary instrument that especially reflects and visualizes what we call "digital media."[27] In the following, the focus will be on the historical dimensions and developments of the screencast, on some of its various fields of application and on the converging functions of processing, storing and transmitting that are performed, visualized and documented by it.

A Short History of Screencasting

Engaging with the screencast as a document of interactivity requires first clarifying its own history. This section will therefore attempt to trace some of the key stages and developments in the practice of screencasting.

In his reflections on the screenshot, Gerling has already pointed out that there is a difference between those processes that *image a screen* – "externally" – with the help of another, optical medium (usually a camera) and those that perform this function – "internally" – in their own medium, the latter process being equivalent to "storing."[28] As a general term for both types of image-making, he therefore refers to the word "Schirmbild" (*screen image*) or "Schirmbildfotografie" (*screen-image photography*), which conceptually reserves the screenshot for the "internal" recording of an image from the screen, independent of an external optical device. At first glance, a similar distinction makes sense regarding the screencast

[26] Ibid., p. 14; transl. J. E.

[27] Even though Winkler emphasizes that Kittler's triad applies to all kinds of media, this article will focus on the screencast as a technique that is particularly relevant in the context of digitality.

[28] Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit., p. 150.

as well, which could be subsumed by analogy under the umbrella term *screen-image videography*.[29] This broader category would then – alike Gerling's approach – include external as well as internal variants of a "moving screen image recording," while the "screencast" (alternatively, the term "screen capture" is also common[30]) refers to the purely internal, completely digital recording variant.

If we now look at the possibilities and contexts in which screens were and are "externally" captured, we end up with such heterogeneous phenomena as early x-ray films of moving frog legs,[31] the special effect of rear projection in film,[32] illegal practices of film pirating in cinema[33] and the media-reflexive presence of screen media in (other) screen media.[34] Historically, however, the transformation of screen images into *other* screen images has developed particular relevance in the context of the emergence and establishment of television, which, due to its fluidity in broadcasting, was dependent on recordings of screens as an aid, especially in its early days.[35] Thus, until the establishment of cheaper magnetic tape recording techniques, television was predominantly a live medium, which could only be saved indirectly by filming the broadcast monitor or by other means of transferring what was broadcast to film.[36] And at the same time, non-live material, such as pre-produced

[29] Alternatively, one could perhaps speak of *screen-image cinematography* or *screen-image video*, although these terms may suggest too strong a difference between cinema and video as technologies and dispositifs. Another alternative would be *screen-image filming*, because it emphasizes the process of filming (apart from the underlying technologies). However, similar debates about the potential *best naming* of the process also played a role when the term "screencast" was coined, as will be explained below with regard to Udell.

[30] See, for example: Nea Ehrlich: *Animating Truth. Documentary and Visual Culture in the 21st Century*, Edinburgh 2021, pp. 122.

[31] The Scottish doctor and radiologist John MacIntyre experimented with film(ic) recordings of x-ray screens around 1896 already and produced the – according to its opening credits – "First XRay Cinematograph ever taken, shown by Dr. Macintyre at the London Royal Society, 1897." See Cinemad3cinema: *Dr. Macintyre's X-Ray Film*, April 6, 2013, https://www.youtube.com/watch?v=xopG-bHeXGk (last seen: August 9, 2021).

[32] For a short history of rear projection, see John Brosnan: *Movie Magic. The Story of Special Effects in the Cinema*, London, 1974. The mechanism became technologically feasible around 1930 (see ibid., p. 47 ff.).

[33] This legal and also appropriative dimension of the screenshot and screencast would be worth a separate, intensive consideration, but unfortunately cannot be done within the frame of this article.

[34] See, for example, some of the contributions in Kay Kirchmann and Jens Ruchatz (ed.): *Medienreflexionen im Film. Ein Handbuc*h, Bielefeld 2014.

[35] See, for example: Albert Abramson: "A Short History of Television Recording", in: *Journal of the SMPTE* 64 (1955), pp. 74–76.

[36] As Knut Hickethier points out: "Television, until 1958, when it did not use film as storage material, was a live event. The images recorded by one or more electronic cameras in the studio were *mixed* in the control room in an alternation of shots similar to film and broadcast immediately. At the same time, what was shown disappeared unrepeatably. If

films, could only be televisually broadcasted if they were filmed with the help of television cameras[37] or optically scanned with the help of corresponding equipment.[38]

one wanted to record something, it had to be shot with film or filmed from the screen. This form of screen recording was called "Filmaufzeichnung" (FAZ), and it was mainly used in artistic productions and even there only rarely because of its high costs." (Knut Hickethier: *Geschichte des deutschen Fernsehens*, Stuttgart, Weimar 1998, p. 122; transl. J. E.) This description illustrates very clearly how the technically television-specific form of (live) transmission (without storage), in Kittler's sense, results in a media-specificity, and how other processualities develop and *dock* here for this reason (meaning: *doubled filming*; either in the sense of a direct filmic recording of a television play performance on the set (whereby this image was not identical with the television image) or just indirectly through the filming of the broadcast monitor with a film camera). And interestingly, it is this alternative storage that, from today's point of view, makes it possible to comprehend television and its media-specificity retrospectively as a media historical as well as theoretical object.

37 To name an example: The advertising brochures for the so-called "Fernauge" ("tele-eye" or "remote eye"; transl. J. E.), a television camera model by Grundig from the 1950s, describe as one of the functions of this camera its ability to take film scans of projected images. The 1956 brochure reads: "Film scanning. Both substandard films and normal films can be made visible on any number of television receivers in different rooms by means of the 'Fernauge.' Television transmission can also take place simultaneously with film projection!" (see GRUNDIG: Das GRUNDIG Fernauge (advertising brochure, 1956), http://www.fernsehmuseum.info/grundig-electronic-1954-57.html (last seen August 9, 2021; transl. J. E.). This function is also described in detail in the advertising material from 1957: "Television camera for film scanning. The device shown is used for simultaneous television transmission of films during normal film projection onto a screen. With the help of a tiny mirror, an imperceptible portion of light is taken from the projector image and fed to the television camera mounted on the side. The film image appears high-contrast and bright on the screen of the connected television receivers, which can be set up in any desired room." (see GRUNDIG: GRUNDIG INDUSTRIE-Fernsehen mit dem FERNAUGE (1957), http://www.fernsehmuseum.info/grundig-electronic-1954-57.html; last seen August 9, 2021; transl. J. E.). Alternative procedures were and are the line-by-line or point-by-point scanning of the film strip by a scanner or also the projection of the film directly into the television camera (see, for example, Bettina Simon: "TV at Bosch. The History of Fernseh GmbH," Bosch.com, no date, https://www.bosch.com/stories/television-history-at-bosch/, last seen: August 9, 2021). These technologies raise interesting questions about the differentiation of *screen-image videography* in comparison to *scanning* and about how the *screen* is to be defined in the context of screen video. We will come back to this in relation to the phenomenon of machinima.

38 Scanning devices for film strips existed very early on. One example is the "Mechanische Universalabtaster für Personen-, Film- und Diapositivübertragungen" (Mechanical Universal Scanner for Personal, Film and Slide Transmissions; transl. J. E.) by the Fernseh Aktiengesellschaft of 1938, which thus designates as two of three functions of the apparatus for television broadcasting the reproduction of existing images (film and slides), which would normally be projected onto screen (see Kurt Thöm: "Mechanischer Universalabtaster für Personen-, Film- und Diapositivübertragungen", in: *Fernseh A. G. Hausmitteilungen aus Forschung und Betrieb der Fernseh Aktiengesellschaft Berlin* 1/2 (December 1938), pp. 6–11.). An interesting example for the televisual screencasting of already televisual material is the broadcasting of space travel during the Apollo Missions at the end of the 1960s. The television signals received from space by Apollo 8, for example, could not be directly broadcasted to regular television screens but had to be translated into the right television broadcasting image standard first. Therefore, the incoming visual material had

However, external / optical screen recordings were not only relevant for the historiography of television. As Gerling[39] and Allen[40] note with regard to the screenshot and the computer screen image in general, these have a weighty share in the historiography of computer media and their interfaces as well, which are often only retrospectively accessible in the form of screenshots. The same applies – in the sense of the specificity described above – to the screencast and its ability to document interfaces in action.

Searching for an example of this kind of visual historiography, what might come to mind firstly is "the mother of all demos," Douglas Engelbart and his team's demonstration of the so-called NLS system at the 1968 Fall Joint Computer Conference[41], which was visionary with regards to many of the features of future computing (networking, interactivity, controlling, interfaces, etc.). This demo is particularly interesting in the context of an investigation of screencasting as it can be regarded as the perfect illustration of the transition from external to internal screen-image videography. Indeed, the film documentation of this demonstration is not only an impressive contemporary document of the development of the computer and its processuality, but also a record of the complex screen(casting) arrangement through which this demo was live-computed, live-transmitted and recorded at the same time.

The documentary of the demo begins – and this is often overlooked[42] – with a number of inserts that describe in detail the setting of Engelbart's live presentation in front of an audience and also its parallel documentation in film form (see also Fig. 1–3).

> This movie captures directly a technical-session presentation made at the Fall Joint Computer Conference in San Francisco, on December 9, 1968. The movie screen will show what was projected by a high-powered TV Projector onto a 22' x 10' screen mounted at the front of the 2000-chair Convention Center Arena, and the sound track will reproduce what came over the loudspeakers.

to be projected onto a special cathode ray tube and then filmed / scanned by another television camera off the screen (see Bill Wood: "Apollo Television", in: *Apollo Lunar Surface Journal* (Background Material) 2005, pp. 1–45, here p. 5. https://www.hq.nasa.gov/alsj/ApolloTV-Acrobat7.pdf).

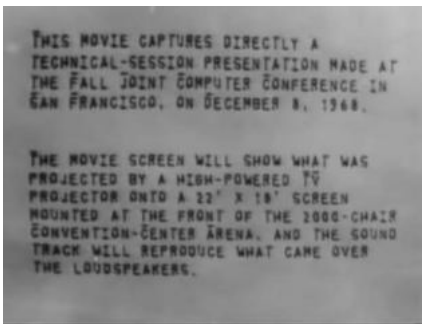
39 See Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit., pp. 153–155.

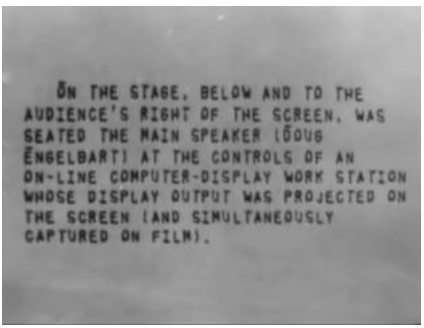
40 See Matthew Allen: "Representing Computer-Aided Design: Screenshots and the Interactive Computer circa 1960", in: *Perspectives on Science* 24/6 (November–December 2016), pp. 637–668.

41 For an online version of the video see MarcelVEVO: *The Mother of All Demos, presented by Douglas Engelbart* (1968), July 9, 2012, https://www.youtube.com/watch?v=yJDv-zdhzMY (last seen: August 9, 2021).

42 In the versions of the demo that can be found online, this opening sequence is often cut off completely.

On the stage, below and to the audience's right of the screen, was seated the main speaker (Doug Engelbart) at the controls of an on-line computer-display work station whose display output was projected on the screen (and simultaneously captured on film). [...]
The capturing on film of the audio and video was a process subsidiary to the presentation, and the latter was not stopped for the two times when the movie-camera operator had to load fresh film -- consequently, there are noticeable gaps between reels (of the order of a minute).
Signals from auxiliary television cameras were sometimes switched to the projector – the opening scene is from such a camera, showing Engelbart's Face view, just after he was introduced.[43]





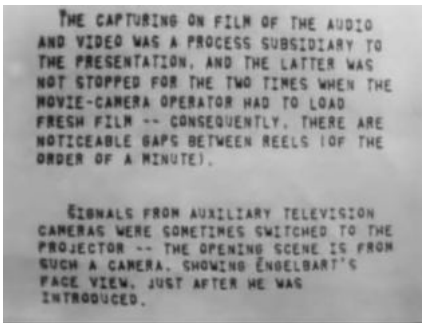


Fig. 1–3: Explanation of the film and screen setting in the form of intertitles at the beginning of the demo.

What is so special about this interconnection of cameras, computers, screens, monitors and operators is that it is an overlap of three display dispositifs. First of all, there is the analogue *film camera* which records the televised presentation as it was transmitted / projected live on a (cinema) screen in the congress center (partly with the help of image mixers); in other words, this analogue recorded screen is the filmic document that we can still look at today to know what happened back then (apart from the gaps that occurred because the cameraman had

[43] See MarcelVEVO: *The Mother of All Demos, presented by Douglas Engelbart* (1968), op. cit.

to change the film reels for the 90-minute presentation[44]). Next, there are the *TV cameras* on site in San Francisco and Menlo Park, which are used to interconnect what is happening on the CRT monitors of the computers with what is happening on the screen and on stage (by showing, for example, Engelbart's head or his hands on the controls, sometimes in soft or hard split-screen with the view of the computer display *on which* he is currently working etc.; see Fig. 4–6).







Fig. 4: Douglas Engelbart pointing to the screen / the camera. | Fig. 5–6: Image overlay on-screen, mixing the screen image with live-action footage of Engelbart and his controls (handset, keyboard, mouse).

And, finally, some of these TV cameras turn out to be an integral part of the *hardware* of the demonstrated computers, as the demo itself reveals after approx. 40 minutes, when a live switch is made to a TV camera in Menlo Park. This camera shows a computer case being opened, revealing another TV camera directed at the CRT display of the computer. In parallel, the sequence is superimposed with the familiar screen view, which shows Engelbart's live interaction with the computer's display – e. g., when he is moving the mouse (see Fig. 7–10).

[44] So once again we are dealing with "cuts," as Frosh and Gerling consider them constitutive for the screenshot.

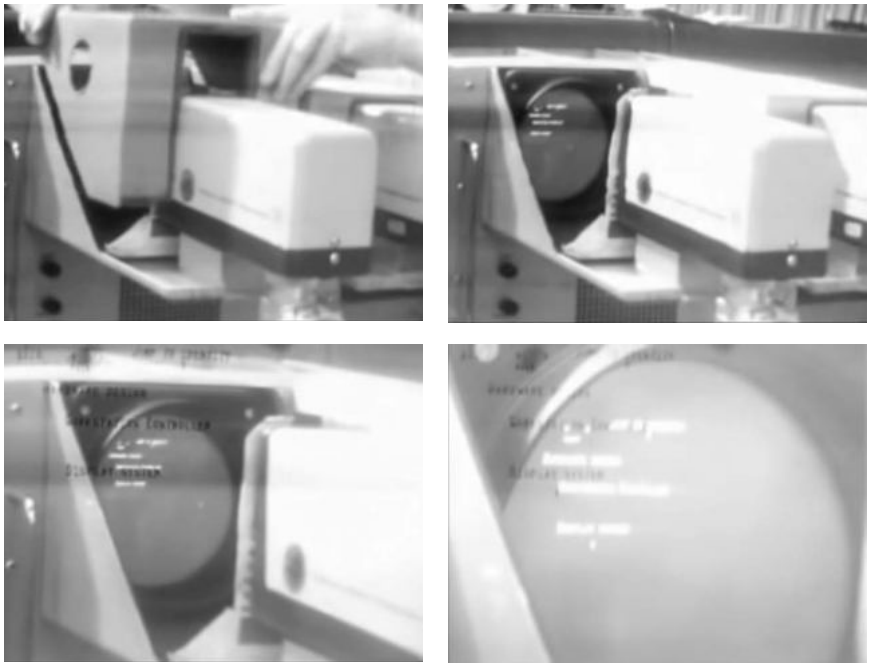


Fig. 7–10: Images showing the computer's high resolution CRT screen (left) and the TV camera (right) that captures the CRT display, partly overlayed with the transmitted view of the screen in inverted colours).

Screenshots [!] taken from *The Mother of All Demos, presented by Douglas Engelbart (1968)* (source: MarcelVEVO, July 9, 2012, https://www.youtube.com/watch?v=yJDv-zdhzMY, last seen: August 9, 2021).

This sequence is particularly noteworthy because in this complex arrangement of technical gaze structures it becomes obvious how, in the course of this *external* filmic and at the same time televisual recording and projection, what could ultimately be called an *internal* screencast is constituted. Because the camera that films the round CRT screen of the computer (the white box on the right in Fig. 7–10), is not only there to make the image transferable for the screen presentation. It appears as part of the hardware of the computer and ensures, as Engelbart explains, that the flickering image of the actual computer monitor can be turned into a nearly flicker-free (and now rectangular and inverted) view through the scanning and translation of the camera and additionally be projected (and thus rendered filmable) onto several monitors. This transition from the external to the internal screen image is supported visually by zooming in on the round CRT display until almost nothing can be seen of its edge in the close-up (see Fig. 10). This increasingly screen-filling image of the

display is overlaid with the camera view coming from the recording device still visible at the far right edge of the frame, in order to enable direct comparison of the two images (external and quasi-internal).[45] The threshold between what is *computer-external medial imagery* and *computer-internal medial imagery*, what is *still* an optically external, analogue recording or already an internal electrical[46] sampling and output of a digital signal, and what is consequently general *screen-image videography* or already a *screencast*, becomes particularly clear in this nested image dispositif and the possibility of its cinematographic penetration.

This media specificity of the computer – i. e., that its development and use are dominantly related to screens and the interactions visible on them – is therefore initially declared to be the main goal of the whole demo, as Engelbart states in the beginning:

> We are going to try our best to *show you rather then tell you* about this programme. A *very essential part* of what we have developed technologically is *what does come through this display* to us and I'm going to start out without telling you very much about the programme, but I just *run through a little bit of the action* that this provides us.[47]

With the credo of "show you rather then tell you" and the figurative pointing of the finger at the camera / screen at exactly the moment when Engelbart speaks of "what does come through *this* display" (see Fig. 4), the screen visuality of the computer becomes the sole focus of interest; and at the same time it is the visual "action" that plays the main role in this *screen film / video / cast*. What exactly is being calculated and how this can be described verbally or mathematically is a secondary matter; the main attraction is what it looks like and the interaction it enables.

With this demo, Engelbart and his team not only succeeded in establishing controller techniques, interface aesthetics and workflows that still characterize our everyday computer life (mouse, telephone conferencing, shared documents, etc.), they also created a prototypical representation of what a screencast is and how it combines the three functions that are equally important for this *new medium*: storage, transmission, and processing.

[45] A zoom-out then takes us back to the view and a pan through the computer room in Menlo Park, which Engelbart comments on with further information about the display technology and the camera-computer setup; until finally we cut *back* to Engelbart in the convention centre.

[46] Even if not yet purely digital.

[47] See MarcelVEVO: *The Mother of All Demos, presented by Douglas Engelbart (1968)*, op. cit., emphasis added.

However, it took several years before this special visual form of computer / interface documentation was given its own name. In November 2004, Jon Udell, a software developer and author who worked at that time as lead analyst, columnist, and blogger-in-chief for the tech magazine *InfoWorld*, initiated the search for a proper terminology. As part of his work, he has produced screen videos since the mid-1990s, primarily for demonstrating and explaining software.[48] Since 1993/94 and the release of *Lotus ScreenCam*, probably the first purely computer-based and thus internal screen video capture tool,[49] numerous similar program solutions have followed, which were marketed primarily for work and training contexts. Examples include *Snapz (Pro X)* (since 1995) and *Camtasia* (since 1999). With the advent of *Windows Media Encoder* (since 2003) and *Apple Quicktime X* (since 2009), screencast options have also been integrated into common operating systems.[50]

In November 2004, it was Udell who, in a post entitled "Name that Genre," called on his readers to generate a unifying term for this moving-image practice:

> So what should I call the medium -- or, as Eric Hanson says, the genre -- that I've been developing? TechSmith, the company that makes Camtasia Studio, calls it *screen recording*. Microsoft calls it *screen capture*. Qarbon uses the term *viewlet*. The generic term I've been using until now is *screen video*. But none of these is especially catchy, and none really conveys what I'm aiming for. The name I'm seeking would describe:

[48] See Jon Udell: "Movies of Software," in: *InfoWorld.com*, November 11, 2004. https://web.archive.org/web/20041114043159/http://www.oreillynet.com/pub/a/network/2004/11/11/primetime.html (last seen: August 9, 2021).

[49] See Doug Barney: "ScreenCam helps show users how to build document models," in: *InfoWorld* 15/48 (November 29, 1993), p. 22. https://books.google.de/books?id=_joEAAAAMBAJ&pg=PA22&dq=lotus+screencam&hl=en&ei=nnAaTa_MPMSGnAf3pKjTDg&sa=X&oi=book_result&ct=result&redir_esc=y#v=onepage&q=lotus%20screencam&f=false (last seen: August 9, 2021)

[50] While the screenshot even found its way onto common computer keyboards from the beginning of the 1980s with the button / key "print screen" (in short form: "PrtScn" or "PrtScrn") (see also Gerling: "Photography in the Digital", in: *Photographies* 11/2–3, op. cit., p. 154), this prominence of the keyboard shortcut has not yet been bestowed upon the screencast. An exception are game consoles and their controllers: Playstation 4 implemented the "Share" button in 2014, which made it possible to save up to 15 minutes of gameplay and to upload it via different channels and social media. Holding the button produced a screenshot, while a *double click* started a recording session. Microsoft was even a bit earlier, as they offered a DVR feature and a related *voice shortcut* with their XBox One already in 2013. The voice command "xbox record that" caused a saving of the last 30 seconds of gameplay while the "Game DVR" menu made it possible to save up to 5 minutes of the preceding game or to initiate a new recording. Additionally, current videoconferencing tools, as they experience a boom since the Covid 19 pandemic, primarily offer tools for sharing and recording the screen (incl. audio); while screenshots have to be made externally, screencasting (as live broadcasting and recording) is firmly implemented here.

> A progressively-downloadable video,
> which shows interaction with software,
> as is narrated by a presenter,
> or as emerges in a conversation."[51]

The *genre* that Udell describes is very close to the setting that Engelbart's demo established. So the framework seems quite narrow: it's about software in action and its verbal explanation by one or more people. In response to his call, Udell ends up receiving over 70 suggestions, which he lists and evaluates in a next blog post.[52] He crowns the term "screencast" (even ahead of the more often mentioned "democast" and "appshow") as the winner,[53] which was suggested by readers Joseph McDonald as well as Deeje Cooley – and thus a term that maintains the TV background of screen recording (as broadcasting).[54]

But Udell not only helps with the naming. He regularly provides experience reports, production tips and thus further *genre* definitions of the screencast, which he calls a "powerful but underappreciated form of video" and whose added value he sees – especially in comparison to the still image – in the mediation of "software experiences."[55] The design principles that Udell suggests for screencasting also continue the line that Engelbart already laid out with his demo: "Show, don't

51 Jon Udell: "Name that Genre", in: *InfoWorld.com*, November 15, 2004, original emphasis, https://web.archive.org/web/20041116201559/http://weblog.infoworld.com/udell/2004/11/15.html (last seen: August 9, 2021).

52 Jon Udell: "Name that genre: screencast", in: *InfoWorld.com*, November 17, 2004, original emphasis, https://web.archive.org/web/20041119210835/http://weblog.infoworld.com/udell/2004/11/17.html (last seen: August 9, 2021).

53 In his blog post, Udell additionally mentions the terms "vidcast," "vidcon" and "software movie," but he dismisses all of them (Udell: "Name that genre", in: *InfoWorld.com* 2004, op. cit.). The list resulting from his call also includes terms such as "screenmovie," "screen video," "screentake," "videoshow," "smoovie," "udelling," "videodemo" or "usage capture" (Udell: "Name that genre: screencast", in: *InfoWorld.com* 2004, op. cit.). What is interesting about Udell's selection is how wrong he was in his assessment of the term "app" in view of current software developments: "Although I find *appshow* compelling, I'm not sure that app is an evocative term for a wider audience. And while *democast* has all the right connotations, it packs an extra syllable and your mouth has to work harder to say it" (ibid.).

54 Above all, however, it is also a reference to the concept of the podcast.

55 See Udell: "Name that genre", in: *InfoWorld.com* 2004, op. cit. Potential fields of application for screencasts, according to him are the documentation of "failure scenarios," a broader "usability analysis" and mutual help in the sense of "users supporting users." In these contexts, he sees clear advantages of moving over common still image variants: "Whatever the medium, the state of the art for this mode of communication is text, possibly augmented by static screen shots. But if a picture is worth a thousand words, a movie may (literally) be a thousand pictures--plus voice annotation" (ibid.).

tell," "Make it real" and "Keep it interactive" are Udell's guidelines,[56] which means that screencasting is about the visuality of (inter)actions with software and – in the sense of the televisual tradition – a certain *liveness* that extends the interactivity of the on-screen action to the frame of reception.

"Lots of folks need to describe, demonstrate, or document the behaviour of software, and this is a powerful way to do it,"[57] Udell finally summarizes the benefits of this technique. Once again, it is thus storing (documentation), transmission (description) and processing (demonstration)[58] that come into focus with the screencast. And at the same time, it becomes clear that a history of screencasting is entangled with a screencasting of history – in the sense of a documentation of "software experiences" – that is, the screencast makes it possible to write a history of interfaces in (inter)action.

A Short Screencasting of History

It is Udell himself who uses his screencasts not only for the documentation of software, but also to test the added value of this video technique in other contexts – such as internet historiography. His screencast on the HEAVY METAL UMLAUT (2005)[59] is a key example of this. The video shows in fast motion the creation and transformation of the Wikipedia article on the so-called "röckdöts," which refers to the use of umlaut dots in heavy metal culture (e.g., in band names like Motörhead or Mötley Crüe). For this – one could say – *stop-motion screencast,*[60] he generated

[56] Jon Udell: "Screencast guidelines", in: *InfoWorld.com*, January 4, 2005, https://web.archive.org/web/20050105052454/http://weblog.infoworld.com/udell/2005/01/04.html (last seen: August 9, 2021).

[57] Udell: "Name that genre", in: *InfoWorld.com* 2004, op. cit.

[58] The connection between processing and demonstration would have to be explored in much more detail, which unfortunately can only be done implicitly within the framework of this article.

[59] Available at https://jonudell.net/udell/gems/umlaut/umlaut.html (last seen: August 9, 2021).

[60] The temporality of screencasts is of course a highly interesting aspect as well and could be examined more closely. While Udell produces the sequence from individual stills, the reverse variant is also conceivable. Ben F. Laposky, for example, experimented with the photographic depiction of electronic signals in the early 1950s. His so-called "Oscillons" or "Electronic Abstractions" consisted of photographs of a cathode ray oscilloscope onto which he projected various abstract patterns using a sine wave generator and other equipment. The actually fleeting electronic pattern as a sequence (as an early example of a processed screen image) was thus photographically frozen in a single still. (See Ben F. Laposky. "Oscillons: Electronic Abstractions", in: *Leonardo* 2/4 (October 1969), pp. 345–354).

screenshots from the version history of the respective Wikipedia articles and converted them into a filmic chronological time-lapse sequence with audio commentary (see Fig. 11–13). He also repeatedly sets temporal caesurae, fast-forwards and rewinds, highlights and evaluates intermediate states – for example, when it comes to the (im)possibility of integrating the "röckdöts" as a font or when the article page briefly falls victim to vandalism (see Fig. 13).

By means of this approach, Udell once again emphasizes the added value of the screencast compared to the screenshot, which he sees in its fluidity and the immediate comprehensibility of processualities that also promise a historiographical gain in knowledge. Richard Rogers therefore takes Udell's video as a starting point to conceptualize the screencast as a digital method in its own right and to develop corresponding tools for researching web(site) history.[61] "Screencast documentaries"[62] are thus presented by Rogers as a legitimate scientific tool for internet research, which makes it possible, for example, to document "the birth of user-generated content."[63] Based on Udell's model and using the Internet Archive's Wayback Machine, Rogers himself also produces a video called Google and the politics of tabs (2008),[64] which deals with the transformation of the Google home page. He also cites the videos The New York Times – A Web Historiography (2011; a study of the NYT home page and its offerings)[65] and TheKnot.com (2012; a film about one of the largest wedding planning websites in the US)[66] as other examples. For Rogers, the advantages of this form of *website* history as *web* history – in its fluid rather than static form – lie in the fact that this history can be narratively retraced in the flow of images and parallel to the commentary:

61 Richard Rogers: "Doing Web history with the Internet Archive: screencast documentaries", in: *Internet Histories. Digital Technology, Culture and Society* 1/1–2 (March 31, 2017), pp. 160–172.

62 Ibid.

63 Ibid., p. 9.

64 For more info see Richard Rogers/Govcom.org: *Google And The Politics Of Tabs*, no date, https://movies.digitalmethods.net/google.html (last seen: June 18, 2022) and for the video Digital Methods Initiative: "*Google and the politics of tabs*", June 1, 2015, https://www.youtube.com/watch?v=oxiFVcFBsUE (last seen: August 9, 2021).

65 See Eelke Hermens: "*The New York Times – a web historiography*", November 18, 2011, https://vimeo.com/32319207 (last seen: August 9, 2021).

66 The film is not available on YouTube anymore but can be retrieved via the Wayback Machine. See: Mathias Schuh: "*TheKnot.com – A Website Historiography*" (produced by Maya Livio, Jules Mataly & Mathias Schuh), November 16, 2012, https://web.archive.org/web/20220202022252/https://www.youtube.com/watch?v=5cxVXJthETA (last seen: August 9, 2021).



Fig. 11–13: Screenshots from Jon Udell's Heavy Metal Umlaut (source: Jon Udell, January 22, 2005, http://jonudell.net/udell/gems/umlaut/umlaut.html, last seen: August 9, 2021).

> Once captured, the website history may be narrated; in the examples given, the stories revolved around loss, continuity and transformation. They concern how the history of a single website may encapsulate the history of the Web, how so-called old media perpetuates itself in the new media, and how the transformation of an institution may be captured.[67]

The programming and redesigning of websites as processing is thus interrelated with the processuality of history and storytelling; and the screencast appears as the only medium that can adequately depict this dynamic of the digital.

But historiography in screen image videography does not always take place as explicitly, intentionally and with scholarly interest as in Roger's design of the screencast as a digital method. Instead, the historically valuable archiving of time-specific interface aesthetics is often a by-product of what one might designate as more everyday documentary practices of screen capture for entirely other reasons – for example in the context of recording interactive and virtual realities.

67 Rogers: "Doing Web history with the Internet Archive", in: *Internet Histories.* 1/1–2, op. cit., p. 11.

Because screencasts document not only what the machine does or calculates (in the sense of processing), but it does this (as an interactive machine) always in interaction with a supposed external world, in the interplay of input and output, for which the screen as interface visually bears witness. Capturing screens in this sense serves to document screen action and reflects the fact that virtual action is always real action (of machines and / or users) and that screencasts therefore do not (re)produce purely artificial images, but on the contrary also record *reality*.[68]

In this regard, the screencast has found one of its dominant uses in the field of gaming. Phenomena such as machinima and other forms of (in)game cinematography[69] are an example of this, as is the explicit screen(broadcast)ing of games that takes place in the form of Let's Play videos and on broadcast platforms such as *Twitch*.[70]

The development of machinima as a genuine form of recording digital game events is particularly interesting for the theoretical assessment of

[68] In her study "Animating Truth," Ehrlich (2021) examines in detail this *realism* of animated moving images, whose reality, according to her, can only be documented via screens: "The virtualisation of culture requires omnipresent screens through which all digitally virtual actions and spaces are mediated. Screens thus act as a portal into *other*, extended aspects of today's real, which is increasingly a mixed reality combining the virtual with the physical. Daily actions are progressively screen mediated, and new visual representations are needed to construct and transmit information in these digital-virtual worlds." (Ehrlich: *Animating Truth*, op. cit., p. 42) She therefore sees screen captures as a photography-analogue documentation medium of the virtual age when she speaks of "mixed realities" (in reference to machinima, as an example of such a documentation practice): "In other words, in the documentation of virtual realities using machinima, animation does not function as an interpretation or a substitute for photography, but rather as a mimetic visual portrayal of events, turning machinima into documentary capture animation. By *documentary capture animation* I mean the direct capture in animated form of animated referents, similarly to *documentary film*, which captures the referents before the camera" (ibid., p. 120).

[69] Another interesting example of an in-game (video) recording practice is the *instant replay* – a screencast carried out by the game itself, so to say. One of the earliest examples of this type of in-game produced recording can be found in the Arcade game *Charley Chuck's Food Fight* (1983, General Computer Corporation / Atari, Inc., Atari 68000), which used a feature to replay "exciting" gameplay events to the player (see *American Classic Arcade Museum (ACAM):* "Charley Chuck's Food Fight" (undated), https://web.archive.org/web/20130501030009/http://www.classicarcademuseum.org/game-of-the-month/food-fight.htm, last seen: August 9, 2021). Another example is the basketball sports game *One on One* (1983. Electronic Arts, Apple II) whose instant replay feature paid tribute to the use of instant replays in sports television (see Henry Lowood, Eric Kaltman, and Joseph C. Osborn: "Screen Capture and Replay: Documenting Gameplay as Performance", in: Gabriella Giannachi and Jonah Westerman (ed.): *Histories of Performance Documentation. Museum, Artistic, and Scholarly Practices*, London, New York 2018, pp. 149–164, here p. 156).

[70] See, for example, Judith Ackermann (ed.): *Phänomen Let´s Play-Video. Entstehung, Ästhetik, Aneignung und Faszination aufgezeichneten Computerspielhandelns*, Wiesbaden 2017 or T. L. Taylor: *Watch Me Play: Twitch and the Rise of Game Live Streaming*, Princeton 2018.

screencasting, because the relationship between external and internal processes, discussed above, becomes central here again. The term machinima is a portmanteau word build from "machine" and "cinema" and became established around 1998.[71] It is defined as "filmmaking within a real-time, 3D virtual environment, often using 3D video-game technologies."[72] Nitsche distinguishes between two forms of machinima – on the one hand, "inside-out" variants that serve to document game events (following the game logic), and on the other hand, "outside-in" variants that are more concerned with using the game setting as a production environment for their own, different stories (breaking through the game logic).[73] At the same time, and in some ways related to this, there is an important systematic, technical and also historically relevant change within the development and establishment of machinima which is rooted in the production of these *game films*. As Lowood,[74] among others, points out, the first computer game recordings[75] are mostly produced as so-called "demos."[76] This means that the gameplay is saved or recorded as a code that can only be reproduced within the game engine, hence enabling an actual 1:1 reproduction of the gameplay on screen. The demos are thus about the identical replay of sequences in the engine, which is why Lowood also calls them "perfect capture."[77] In 1996, however, such a demo finally

71 Previously, the term "Quake movie" existed primarily because many of the early machinima films were based on this game (see Henry Lowood: "Video Capture: Machinima, Documentation, and the History of Virtual Worlds," in: Henry Lowood and Michael Nitsche (ed.): *The Machinima Reader*, Cambridge / Mass. 2011, pp. 3–22, here p. 7). Anthony Bailey proposed the term "machinema" in the community in 1998, which Hugh Hancock eventually (and mistakenly) changed to "machinima." In addition to machine and cinema, this slight change added the connotation of animation as a third element (see Hugh Hancock and Johnnie Ingram: *Machinima for Dummies*, Hoboken 2007, p. 13 and Michael Nitsche: "Claiming Its Space: Machinima", in: *Dichtung Digital. Journal für Kunst und Kultur digitaler Medien* 37 (2007), http://dichtung-digital.org/2007/Nitsche/nitsche.htm (last seen: August 9, 2021)).

72 *Machinima.org*: "The Machinima FAQ," updated: March 8, 2005, https://web.archive.org/web/20051212155939if_/http://www.machinima.org/machinima-faq.html (last seen: August 9, 2021).

73 Nitsche: "Claiming Its Space: Machinima", in: *Dichtung Digital* 37, op. cit.

74 Lowood: "Video Capture", in: Lowood, Nitsche (ed.): *The Machinima Reader*, op. cit.

75 We are talking here about in-game recordings. Gameplay filmed by a camera also existed before (and still does; see footnote 82) – for example, if one thinks of early recordings of games such as Spacewar! (1962) or Pong (1972). In the end, what is decisive for machinima is the use of the game as the basis for a fictional or also non-fictional narrative, a practice that only starts in the mid-1990s.

76 In this regard, machinima as a phenomenon is closely linked to the so-called "demo scene", in which game enthusiasts and modders got together to write particularly small programs, which – when '(re)played' by the engine – produced pictorial intro sequences (see, for example, Doreen Hartmann: *Digital Art Natives. Praktiken, Artefakte und Strukturen der Computer-Demoszene*, Berlin 2017).

77 Lowood: "Video Capture", in: Lowood, Nitsche (ed.): *The Machinima Reader*, op. cit., p. 6.

heralded the transition from pure game recording to machinima as game-based filmmaking: Diary of a Camper.[78] This was a demo produced in Quake,[79] the first of its kind to stage a minimal narrative plot independent of the game setting. Also striking was the camera perspective that was detached from the first-person shooter perspective via a modification in the code, thus generating a more *objective* view of the action through a medium long shot instead of a point of view.[80] This shift in perspective and game-complementing narrativization was thus a first small revolution in the game recording culture. Another, even more significant one followed in 2000 with Quad God,[81] a 30-minute film[82] also produced in Quake, which was the first not to be saved as a code suitable for demos, but rather captured as a video file *from the screen* respectively as an image data signal. To do this, the makers output the image signal of the game to a video camera and recorded it there so that it could be edited on the computer as a film file afterwards.[83] Consequently, this meant that this type of recording could now circulate independently of the engine. While the early demos were still the result of actual game processing, in which the images on the screen identically reproduced past / stored events and thus reperformed them anew, the subsequent / subordinate and only superficial recording of the images eliminated the identical computation from this form of game documentation. Nitsche therefore describes this change from "demo" to "screen capture" as a paradigm shift, which is closely connected to the change in perspective described above:

> This is a paradigm shift from the recording of the event (in a demo) to the recording of a viewpoint to the event (in a screen capture) – from a new game-based logging format to the established production of moving images as successive still renderings.[84]

[78] *Diary of a Camper* (1996, Matthew Van Sickler / United Rangers Films).
[79] *Quake* (1996), idSoftware / GT Interactive, Microsoft DOS, Microsoft Windows.
[80] See Lowood: "Video Capture", in: Lowood, Nitsche (ed.): *The Machinima Reader*, op. cit., p. 7.
[81] *Quad God* (2000, Joseph Goss / Tritin Films).
[82] This is the length of the versions of the film that can still be found online; see, for example, the comment under the video *Tritin Classic – Quad God – Part 1* (YouTube / Doom Arenas, posted January 7, 2010, https://www.youtube.com/watch?v=kLfgPHrepj4&t=45s, last seen: August 9, 2021) which says "Part 1 of a 33 minute film I did in 1999." Kelland, on the other hand, speaks of a 45-minute version (see Matt Kelland: "From Game Mod to Low-Budget Film: The Evolution of Machinima", in: Henry Lowood and Michael Nitsche (ed.): *The Machinima Reader*, Cambridge / Mass. 2011, pp. 23–36, here p. 24).
[83] See ibid., p. 24.
[84] Nitsche: "Claiming Its Space: Machinima", in: *Dichtung Digital* 37, op. cit. Interestingly, as early as 1996 and even before its release, Uwe Girlich was considering a kind of code-based camera perspective for replays in *Quake*, which would also make it possible to output film files as a result: "The player coordinates and the camera positions may be

The break between demo and capture appears here as a break between continuous processing and a series of screenshots, which opens up an interesting ambiguity with regard to the dimensions of screencasting outlined so far. Because the grabbing of video signals is a strangely hybrid procedure between internal and external screen-image videography, as the image production no longer requires a direct optical recording of the screen, but nevertheless an external (video) camera as storage device.[85]

different," he writes there, outlining the possibility of taking a different perspective on the gameplay for the replay than the first-person shooter cadre. And furthermore: "The demo file can contain console commands, which the client runs during replay. With this feature it should be possible to write a screenshot after every time stamp in the demo file. This makes it very easy to create an MPEG movie out of a DEM file." (Uwe Girlich: "The unofficial DEM format description", July 30, 1996, https://www.gamers.org/dEngine/quake/Qdem/dem-1.0.2.html, last seen: August 9, 2021, see also Henry Lowood: "High-performance play: The making of machinima", in: *Journal of Media Practice* 7/1 (July 2006), DOI: 10.1386/jmpr.7.1.25/1, pp. 25–42, here p., 33 and Lowood: "Video Capture", in: Lowood, Nitsche (ed.): *The Machinima Reader*, op. cit., p. 7). Once again, the relationship between screenshot and screencast is relevant here, as is the fact that the boundaries between demo and recording are directly intertwined when the code (.dem-file) becomes the internal output tool for the external recording (.mpeg-file). The Rangers apparently came up with a similar code-based solution to the perspective problem themselves during the production of Diary of a Camper. The way to convert the code replay into a film file, however, was only taken later on by Joseph Goss and Tritin Film with Quad God.

85 However, there were also filmmakers who relied on the purely external, optical recording of game events for the production of machinima. A relevant example is the multi-part *Second Life* documentary Molotov Alva and His Search for the Creator: A Second Life Odyssey from 2007 (see also Ehrlich: *Animating Truth*, op. cit., pp. 115 ff.). The filmmaker Douglas Gayeton filmed the material from an LCD computer screen with a video camera, a technique he dubbed "rumple-vision." According to him, this approach even improved the image quality because screen capture software running in parallel on the computer would otherwise have slowed down the game's computing power and thus also degraded the image (see Wagner James Au: "Making 'Molotov': How The Man Behind The HBO / Cinemax Special Created His Avatar-Based Documentary, And Why", in: *New World Notes*, May 15, 2008, https://nwn.blogs.com/nwn/2008/05/making-molotov.html, last seen: August 9,2021). In this context, Lowood also speaks of a recording in the style of "cinema verité" (see Lowood: "Video Capture", in: Lowood, Nitsche (ed.): *The Machinima Reader*, op. cit., p. 13), because Gayeton's approach is a kind of participant observation in *Second Life*. At the same time, this cinematic *verité* can be related not only to the avatar Molotov Alva, who is active in the film, but also, on closer inspection, to Gayeton himself as a filmmaker visible in the film, when he himself accidentally enters the picture through the external recording technology: "If you look closely, […] you can see my shoulder. On two shots we decided to leave it in because it was so funny" (see "Making 'Molotov,' *New World News*, op. cit.). Interestingly, Lowood deems the external, i. e., optical, recording technology the even better way to produce documentary material in contrast to internal procedures: "Gayeton's unorthodox production technology sets his work against the perfect capture of demo and replay in several revealing and important ways. His highdefinition camera, set three feet away from his monitor, is separated in every way from game software and proprietary data. There can be no confusion about the status of these images as personal, selected, and indexical. It is a point of view derived from literally pointing at the screen, not a direct recording from an in-game camera or imagery generated from gameplay data. This separation underscores the potential of machinima as a means for capturing perspective and context, as ethnography, documentary, and history rather than

With regard to the previous practice of engine-based demo production, this video variant seems more *external* anyway, because the data is no longer computable, but rather image-based, and thus takes a step further away from its origin (in the sense of the media break described at the beginning). The demo files, too, are of course stored versions of an event that, contrary to the logic of the game, no longer allow for interaction and interactivity. As code fragments that can be computed in the game engine itself, they nevertheless seem closer to the original (or even as original) in their processuality, compared to the more indirect moving image files generated via the diversions of the image signal.

According to Nitsche and Lowood,[86] a second aspect is relevant to this changed image generation practice, namely that the pictorial storage of the game event is accompanied by a stronger *subjectification*. By fixing the camera perspective in the screencast, a clear, unambiguous and unchangeable perspective on the event and thus the event itself is fixed (while the demo still embodies the idea that the ultimate document is available here, namely one that allows the event to be reproduced 100%).[87] But the particular documentary potential of this kind of screencast seems to lie precisely in its fixation. So, when Lowood names the first stage of the emergence of machinima "Perfect Capture: Demo Recording and Replay," and the second "Screen Capture and Documentation,"[88] it becomes clear that here the documentary is not seen in the 1:1 copy of an event (as in the demo), but in a kind of "one-sided," fixed, subjective perspective. As Lowood sums it up: "In short, both fictional and nonfictional machinima can contribute to a documentation project by emphasizing point of view rather than perfect data capture."[89] Thus, if the fixation of the virtual event is related to the reprocessing or different medialization of the data (*pure, internally stored game data* vs. *resulting, externally storable image data*), then the fixation of the camera in this process becomes a symbol that makes the fixation of processing as a document perceptible in its visual aesthetics.

an exact recording of historical events in virtual spaces." (Lowood: "Video Capture", in: Lowood, Nitsche (ed.): *The Machinima Reader*, op. cit., p. 13).

86 Nitsche: "Claiming Its Space: Machinima", in: *Dichtung Digital* 37, op. cit., Lowood: "Video Capture", in: Lowood, Nitsche (ed.): *The Machinima Reader*, op. cit., p. 12.

87 That this idea of an ultimate documentation is also a phantasm is shown by the fact that in the code, for example, the activity of the player outside of the gameplay is only ever indirectly recorded (see also ibid., p. 13); thus, one could say, *a demo is a game(play) data record, not a game(play) record*.

88 A third developmental step that follows screen capture documentation is, according to Lowood, "asset compositing," in which the design tools provided by the game are used even more independently of the game as a production context (see ibid., pp. 14ff.).

89 Ibid., p. 14.

The success of Quad God and the broader attention that the phenomenon of machinima received through the new distribution channels was followed by the direct implementation of cinematic recording techniques in games themselves, for example in The Sims 2[90] and The Movies[91], in which the creation of film sequences is built into the game's plot and instrumental inventory.[92]

If we also look at more recent game developments, it is interesting to see that mixed forms of both tendencies (*demo* and *screencast* or *replay* and *documentary*) can still be found. One example is the so-called *Replay System* of the online multiplayer third-person shooter *Fortnite Battle Royale*,[93] a tool that was introduced in November 2018. This system allows for the subsequent cinematic editing of the gameplay and offers virtually everything a filmmaker's heart desires, i. e., in addition to the basically free choice of camera position (from long shot to close-up etc.), it is also possible to play with slow motion or blurrings. While in the game the view of the gameplay remains bound to the position of the player's avatar, the replay system makes it possible to see the action *liberated* from any perspective (e. g. including that of the opponents) through a freed camera.[94] As Epic Games itself describes the tool:

> You can now save your matches and watch them again from any angle, and share those hype plays with the entire squad. Adjust all sorts of cameras and settings to capture awesome cinematic moments on the battlefield. You can also use the replay system to analyze the match, learn where you can improve, develop strategies and take that Victory! Level those skills up! We actually use this same system internally to shoot all of the Weapon, Outfit, and Limited Time Mode trailers we release.[95]

90 *The Sims* 2 (2004), Maxis / EA Games, Microsoft Windows.

91 *The Movies* (2005), Lionhead Studios / Activision, Microsoft Windows.

92 One could also point to much earlier games that were at least based on the idea of a potential recording or on the production of images that followed the logic of (action) films. One example Nitsche mentions is *Stunt Island* from 1992 (The Assembly Line / Walt Disney Computer Software / Infograme, Microsoft DOS), which offered the possibility of replays with changing camera perspectives within the game (but without a recording outside of the game): "*Stunt Island* provides the player with a playground (a virtual island) where stunts and collisions can be staged between various game objects. These stunts can be played back and suitable camera angles can be arranged to show the stunt in the most effective way. Players do not gain a high score but a spectacle" (Nitsche: "Claiming Its Space: Machinima", in: *Dichtung Digital* 37, op. cit.).

93 *Fortnite Battle Royale* (2017), Epic Games, Mac OS, Microsoft Windows, PlayStation 4, PlayStation 5, Xbox One, Xbox Series X / S, Nintendo Switch, iOS, Android.

94 The only limitation to this free camera is the so-called "replay region," i. e., only a certain area around the avatar is recorded (see The Fortnite Team: "Fortnite Battle Royale – Replay System", in: *EpicGames.com*, November 4, 2018, https://www.epicgames.com/fortnite/en-US/news/fortnite-battle-royale-replay-system (last seen: August 9, 2021)).

95 Ibid.

Two things are interesting about this tool and its description. On the one hand, Kittler's triad appears again, when the Replay System can be used for "saves" (storing) and "shares" (transmitting) but is also utilized for the targeted production (processing) of advertising images. On the other hand, it provides an intuitive user interface for the production of machinima and thus suggests a subsequent *cinematic handling* of the game or a filmic output. At the same time, however, the game sequences and also the adjustments made in the replay system are not output as video files but remain stored as data packages dependent on reproduction within the game and its engine. Consequently, in order to make the finished *films* accessible to a wider audience, they must first be recorded again with an external screencasting tool parallel to the playback in the replay system.[96] The tool thus appears as a hybrid of the two stages outlined by Lowood: it provides the possibility for the perfect cinematic documentation of game events by forcing the viewer to adopt a specific, subjective, particularly *cinematic* (camera) perspective on the events, but at the same time it leaves this cinematic confrontation in demo format.[97] Regarding the internality or externality of the screencast, the question arises again as to how this distinction can be made. Is this differentiation really about the format in which the files are saved internally or externally, as the game's own file format or as a cross-system movie file? Or is screencasting about the process of recording and capturing of processed data, i. e., about the possibility of saving the entire gameplay as a data chain versus replaying it at the end only through a single viewing position of a virtual camera? Or is it just about visuality – that is, the renewed visualization of game events on a screen in an *inactivated* rather than *interactive* mode?

With regard to the *Fortnite Battle Royale Replay System,* it seems at least interesting that here a replay – as in the case of the early demos – can only be made in the identical system. Consequently, this means that the old recordings become unusable with a game update. If one wants to save them permanently, they have to be screencasted with the help of a supplementary non-game tool. Regarding the long-term documentation of the history of screen images and their aesthetics, a *re-processing* seems to be necessary here as well. This means a transformation from the interactive, subsequently infinitely and continuously visually adaptable

[96] This is also common in other games that offer their own in-game camera and video output. In *The Sims 2*, for example, external screencasting tools are often used because the image quality of external software seems to be better than the in-game quality.

[97] The folder in which the replay files are stored locally on the PC also bears the title "Demo."

data package to a fixed perspective and a fixing visual (image) format, which in this form seems better able to outlast times – and not only the current version cycle of a game. In Gerling's words, the "image of an image"" still requires that an "image" is made.

It can thus be stated that these different recording modes (demo and screencast) allow for a further internal differentiation of screen image videography, distinguishing between *external optical recording*, *internal optical recording* and *internal data recording*, although even these differentiations do not appear to be entirely clear-cut (image data are also data, after all).[98] What seems remarkable in Lowood's sense, however, is that the purely internal game data recording has an apparently different or even lower documentary value than the visually captured variant. This may be due to the fact that the storage in / as an image leaves a stronger impression of fixity than the demo file does, because the code deposited in it, through its ever new processing in the replay, may leave the impression that not only images of processes but the underlying processes themselves continue to take place here. In short, *the screencast is an image of an image, the demo is the image*. Or, in other words, *rendering is not recording.*

For the documentation of interactivity, it therefore seems elementary to keep the screen as the interface of processing present as a visual idea in the form of the recording. That would be one reading. Another would be that in recordings such as those of the *Fortnite Battle Royale Replay System,* the phantasm of total documentation or "perfect capture" is fulfilled insofar as the game event itself remains inevitably past and fixed, while its replay in the engine no longer documents just *one* screen, but all those that are potentially possible.

[98] With reference to the Desktop Documentary, Distelmeyer therefore describes the process of recording screens as an actual capture of data, in which it is not an image that is stored, but its code. He writes about the screencast: "This audiovisual and moving extension of the screenshot, although it is meant to look like one, is not a *recording* from our user perspective, not a view from the outside. These kinds of videos are not so much recordings as takedowns: They take the data from the framebuffer, the forwarding of which is needed at every moment to display the pixels on the monitor, and assemble it in the form of a video file. These interface operations are intended for an outside. Internal processes that are prepared for the external stage of action of the desktop are in turn stored and adjusted internally in such a way that they act like an external capture of the external preparation." (Distelmeyer: "Durch und über Computer", in: Doll (ed.): *Cutting Edge! Aktuelle Positionen der Filmmontage,* op. cit., p. 210; transl. J. E.) Building on this statement, it would be worthwhile to take a closer look at the relationships between data and image, outside and inside, subjectivity and objectivity, as Distelmeyer contrasts the subjectivity of the virtual camera view or the view of the user with the "inner world" of the computer and the processes that run within it.

Outro

This brief look at the history, historicity and historiography of screencasting only touches on a few key points that are remarkable regarding the question of the connection between screen image videography and the documentary. Numerous other points could be added – both on the question of the blurred demarcation between external and internal recording, on the relationship between temporality and spatiality and on the question of a necessary subjectivity in the actual objectivity of the document, as it is probably relevant for the theoretical recording of any form of (moving) image documentation. More in-depth considerations on the relationship between *virtual* and *real* cameras as well as on other phenomena in which screencasting is elementary had to be omitted – one might think here of desktop documentary,[99] on the one hand, and the extended field of tech demo,[100] on the other. What the addressed examples have shown, however, is that processing as a "neglected media function" in the sense of Winkler comes into documentary focus in the screencast, because in the simultaneously spatial and temporal shift and the recoding of a primary data event into a primary image event, what was becomes storable and transportable in its processuality. What this article has hopefully succeeded in doing is to make screencasting as a documentation of processuality more visible as a process itself.

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[99] See, for example, Distelmeyer: "Durch und über Computer", in: Doll (ed.): *Cutting Edge! Aktuelle Positionen der Filmmontage,* op. cit., Luka Bešlagić: "Computer Interface as Film: Post-Media Aesthetics of Desktop Documentary", in: *Journal of Art and Media Studies* (October 2019), Miklós Kiss: "Desktop documentary: From artefact to artist(ic) emotions," in *NECSUS* 10/1 (Spring 2021), pp. 99–119, https://necsus-ejms.org/desktop-documentary-from-artefact-to-artistic-emotions/ (last seen: August 9, 2021).

[100] See, for example, Felix Schröter: "Tech Demos für Computerspiel-Engines als animierte Kurzfilme", in: Franziska Bruckner et al. (ed.): *In Bewegung setzen … Beiträge zur deutschsprachigen Animationsforschung,* Wiesbaden 2017, pp. 129–148, Jordan Gowanlock: "Promoting Computer Graphics Research: The Tech Demos of SIGGRAPH", in: Malcolm Cook and Kirsten Moana Thompson (ed.): *Animation and Advertising*, London 2019, pp. 267–281, Julia Eckel: "Tech Demo / Tech Doku. Zur Wirklichkeit des Animierens", in: Franziska Bruckner et al. (ed.): *In Wirklichkeit Animation … ,* Wiesbaden 2021, pp. 11–32.

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Alan Butler's work explores the materiality of media and technologically mediated realities. Taking on a wide variety of forms through interdisciplinary sculptural, moving image, photographic, and new media processes, the subject of his work examines how realities are constructed alongside image-making technologies. Educated LaSalle College of the Arts, Singapore (MFA, 2009), and the National College of Art and Design, Dublin (BAFA, 2004). In 2021, Butler was a co-curator of Ireland's national pavilion at the Venice Architecture Biennale, and produced a permanent public sculpture for the city of Dublin, called 'Smithfield Utah'. His work has been featured in over 160 exhibitions in museums and galleries around the world.

Azahara Cerezo's research delves into the particularities and contradictions of territory, with its physical dimension being liquefied by global digitalising processes. She has exhibited solo work at Bòlit Contemporary Art Centre (Girona) and Centro de Arte La Regenta (Las Palmas), and taken part in group shows at Bienalsur (Cúcuta, Colombia), Santa Mònica (Barcelona), Nieuwe Vide (Haarlem, Netherlands), MUSAC (León) and MACBA (Barcelona), among others.

COLL.EO is a collaboration between Colleen Flaherty and Matteo Bittanti established in 2012. COLL.EO creates boldly unoriginal media artworks, uncreative mobile sculptures, and uniquely derivative conceptual pieces. With the use of appropriated materials borrowed from a day-to-day context, COLL.EO has developed a filthy rich visual vocabulary addressing artistic, social, and political issues. COLL.EO generates situations in which everyday objects – often toys and games – are altered or detached from their original contexts. Sometimes they appear idiosyncratic and quirky, at other times sinister and morbid, like most by-products of American superabundance and pervasive marketing. COLL.EO currently operates in San Francisco and Milan. For more information, visit colleo.org.

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Jacob Gaboury is an Associate Professor of Film & Media at the University of California at Berkeley, specializing in the seventy-year history of digital image technologies and their impact on our contemporary visual culture. His first book is titled *Image Objects: An Archaeology of Computer Graphics* (MIT Press, 2021), and it explores the prehistory of computer graphics through five objects that shape the production and circulation of nearly all digital images today.

Winfried Gerling is Professor of Concept and Aesthetics of New Media in the European Media Studies program of the Potsdam University of Applied Sciences and the University of Potsdam. His research focuses on the practical and theoretical reflection of photographic media, digital aesthetics, media environments and media art. Recent publication: *Versatile Camcorders – Looking at the GoPro Movement*. (Edited with Florian Krautkrämer. Berlin: Kadmos, 2021.) More information: http://gerling.emw-potsdam.de.

Stephan Günzel has been a Professor of Media Theory at the University of Europe for Applied Sciences (UE) in Berlin since 2011. He is head of the Institute for Design Research and the MA-program "New Media Design". Since 2018 he has been a Visiting Professor and head of Department for Media Studies at the TU Berlin. In 2014, he founded UE's Bachelor's degree program in Game Design, after coordinating the Center for Computer Game Research at the University of Potsdam, which he co-founded, starting in 2008.

Roc Herms was born in 1978 and discovers photography 28 years later, as a tool to learn and combine it with his interest in the Internet, video games and digital culture: showing his passion for technology and the need to take a step further in the photographic practice. "Postcards From Home" and "<YO> <YO> <YO>", two long term projects published in book form, try to shed some light on the life we live inside the computer. "Hacer Pantallazo" is an intimate diary made with screenshots, a capture process that he ends up understanding as the ultimate step on photography's digitalisation.

Rowan Lear is an artist and writer, living in Scotland. Their research traces the emergence of photographing as a bodily, planetary, machinic and multispecies habit, in conversation with philosophies of embodiment, ecology and indeterminacy. They currently work as a seed librarian at Centre for Contemporary Arts, Glasgow, and as a lecturer in photography at University of Cumbria, Carlisle. The rest of the time, Rowan plays with vegetal, mineral and photographic materials, organises workshops and projects, participates in collective study, walks in the sun and writes in the dark.

Gareth Damian Martin (they / them) is an award-winning writer, designer and artist. Their first game, In Other Waters won the Jury Prix at IndieCade Europe, and was widely praised by critics for its "hypnotic art, otherworldly audio and captivating writing" (Eurogamer). Their second, Citizen Sleeper was equally critically acclaimed, and its prose was named "some of the best in all of video games" (Vice). Gareth's criticism has been published in a wide variety of forms, from Eurogamer and Rock Paper Shotgun to Edge Magazine and Frieze Magazine. They are the editor and creator of Heterotopias, an independent zine about games and architecture, and have lectured on the history and theory of games and architecture at the world-renowned Bartlett School of Architecture, University College London. Their game photography has been shown at London's Photographer's Gallery, The Victoria & Albert Museum, and the Lisbon Architecture Triennale, as well as being published in the British Journal of Photography. Gareth also holds a PhD in experimental literature from Royal Holloway, University of London.

Natalie Maximova is a visual artist born in Moscow, Russia and based in Lausanne, Switzerland. She is a graduate of Rodchenko Art School and Ecole cantonale d'art de Lausanne. Natalie's practice began in the field of documentary photography exploring Russian Arctic landscape in its mythological and historical contexts. Gradually, her practice shifted into the interdisciplinary field by incorporating video, 3d animation and video game studies, exploring digital landscape and virtual realities from within.

Sebastian Möring is an Assistant Professor in European Media Studies (a joint program of the University of Potsdam and the University of Applied Sciences Potsdam, Germany) and head coordinator of the DIGAREC (Digital Games Research Center of the University of Potsdam). In 2021 he won the teaching award of the state of Brandenburg. His research focuses on the philosophy and aesthetics of computer games, in-game photography, green game studies, and the implementation of games in educational contexts. For more information and for publications please visit http://sebastianmoering.com.

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Till Rückwart is a media artist whose practice evolves from nonhuman photography, sensor technology, satellite imagery and glitches. The works focus on the interplay of technology and its unexpected malfunctions that influence his thinking about media, society and the environment. He is a Master's student in the European Media Studies program of the Potsdam University of Applied Sciences and the University of Potsdam and works as a research assistant for the Cluster of Excellence "Temporal Communities" at the FU Berlin.

Michael Schäfer is a photography based artist who works predominantly with digital montage. In his artistic projects he deals with current issues of our time. With his digital image montages, in which media images collide with images he has taken himself, he not only comments on current events, but in particular reflects on the rhetoric of the image worlds that surround us. Schäfer received his diploma in Artistic Photography at the Hochschule für Grafik und Buchkunst, Leipzig and has held teaching positions at various institutions (including HGB Leipzig, UDK Berlin, Hartford Art School, CT, USA). His works are in renowned collections and are exhibited nationally and internationally.

Birgit Schneider is a media and visual culture scholar. She is Professor of Knowledge Cultures and Media Environments at Potsdam University. Her research focus are scientific images, the history and present of data visualizations and in particular climate visualizations in-between science, aesthetic and politics. She publishes in the field of climate discourse, cultural geography, media studies and environmental humanities.

Kent Sheely is a new media artist based in Los Angeles, California. His work draws both inspiration and foundation from the aesthetics and culture of video games, examining the relationships between the real world and virtual ones. Much of his work centers around the translation and transmediation of symbols, concepts, and expectations from game space to the real world and vice-versa, forming new bridges between simulation and reality.

Katrina Sluis is Associate Professor and Head of Photography and Media Arts at the School of Art and Design, the Australian National University. She is a founding Co-Director of the Centre for the Study of the Networked Image, London South Bank University and Adjunct Research Curator at The Photographers' Gallery London.

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Sammelband 04

This volume examines historical and contemporary image practices and phenomena, including screenshots, screen photography, screencasts and in-game photography. The individual chapters pose questions relating to the status, ontology and aesthetics of such practices and phenomena and also analyse their cultural and artistic significance. Artistic works explore these questions in the form of various image practices. The authors and artists investigate the potential for a new area of research at the intersection of a range of disciplines, such as media studies, media aesthetics, media history, image studies, photography theory, game studies, media art and game art. As one of the first publications to address these phenomena, this book speaks to a varied audience in the realms of media studies, game studies and cultural studies as well as to members of the general public interested in historical and contemporary practices associated with visual and digital media.

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