doi:10.32020/ARTandDOC/22/2020/7

Ewa WÓJTOWICZ
University of the Arts, Poznań

THE POINT OF COLLAPSE, OR HOW TO ERR IS NON-HUMAN IN POST-DIGITALITY

An error is most commonly defined as something that disturbs a given order. It may be annoying – making a system dysfunctional, a website inaccessible, or a device useless. During the education process we are gradually taught to avoid errors and consider them disgraceful deeds of which we should be ashamed. Speaking of errors, we should remember that the term is also narrowly defined as an unintended language mistake.[1] Since language is a systematic construct and has a lot in common with programming, it makes sense to apply the term "error" to non-human agents, particularly those equipped with so-called artificial intelligence.

Nonetheless, the language-based errors which are stigmatized at school may be inspiring, for example in avant-garde poetry, and past errors may become accepted forms and phrases due to the evolution of grammar or spelling. However, to identify an error we also need to identify an order as a purposefully constructed system that helps to distinguish between right and the wrong.

As we know from art history, the avoidance of formal errors that is so important in the process of academic art education became irrelevant with the arrival of the first avant-gardes. The manual fluency that is required from artists gradually became obsolete and many art movements stood against formalism and perfection. When artists started to let themselves create seemingly inept drawings or ostensibly unfinished ready-mades, the paradigm shifted. This opened the way for the artist to deal freely with the medium, be it a painting or an installation. Then followed the media arts as a field of experiments that were often against the medium, first in the form of so-called reverse engineering and more recently as speculative design. When recalling former avant-garde works that are nowadays considered classics of this genre, we might think of Nam June Paik's famous *Exposition of Music – Electronic Television* (1963), which involved the destruction of TV sets and the distortion of TV images with magnets. These were gestures of subversion against the dominant system of mass media and the imposed asymmetry that resulted from it. A dysfunctional TV set was no longer a fetish of consumption, and television as a medium, which until then had been based on the "one-to-many" communication scheme, stopped being the voice of an oracle that spoke to its passive listeners. Other examples of not avoiding a formal error but rather enjoying its consequences may be provided by artists such as Steina and Woody Vasulka (*Noisefields*, 1974) or

Wolf Vostell (*Dé-coll/age* series). There were also numerous attitudes that arose from conceptual art, such as that of Dieter Froese, the author of the *Failures* video-triptych (1979–1981), in which "he stages failure as the impossibility of filtering something meaningful out of the continuum of the world and fading out a continuous world by the use of certain perspectives."[2]

Even if a history of 20th-century media arts from the perspective of formal and conceptual errors may be tempting, the aim of this text is rather to concentrate on the various aspects of errors, understood as a collapse of both form and content in the contemporary world, which is influenced by post-digital (un)awareness. Surprisingly, the contemporary "error turn," particularly in the increasingly post-digital media arts, unexpectedly has a lot in common with the centenary of the Dada movement, not only with the obvious example of Rosa Menkman's *Radio Dada* (2008). Dadaism eagerly embraced errors, mistakes and confusion, and so did Surrealism a few years later. The latter movement also accepted and praised dilettantism and ineptitude. This attitude was of course also present in several subsequent art movements of the 20th century that involved some sort of primitivism. One of these incarnations arrived in the 1980s, which in global art was represented by many "wild" groups and spontaneous, creative and interdisciplinary initiatives. At the same time, the dilettante attitude disseminated rapidly across culture, particularly in music and literature, but also in visual arts. The right to make mistakes was a liberating force for many academia-trained artists who aimed to get rid of the formal corset of perfection. As Justin Hoffmann, when looking back at the history of various interdisciplinary art movements of the 80s, reminds us: "In Germany the artist and musician Wolfgang Müller (…) coined the term 'geniale Dilletanten' (brilliant dilletants). The spelling mistake in this epithet was an indication of Müller's concern: in cultural praxis there is no such thing as mistakes, only formulation that cuts against the norm. 'Mis-playing, mis-spelling as a positive value, as a possibility for achieving new, as-yet-unknown forms of expression, should be propagated as universally as possible'."[3] The spirit of rebellion against rules, hierarchies, professionalization and aesthetic restraints helped many aspiring artists to emerge; some of them later joined the mainstream, others (like, for example, Jean-Michel Basquiat) became iconic examples of the mechanisms which prove that even – seemingly harmless – artworld revolutions eat their own children. However, being a dilettante or even pretending to be one allowed one to make inspiring mistakes and find unexpected beauty in roughness and freedom in disorder.

When to err is non-human

From the perspective of computing history, an error has always been a problem for coders and a major annoyance for software users. Over the years, the latter have seen too many "Error 404" or "Error 403" messages on the screens of their devices; some remember the widespread fear of the collapse of global systems that was called the Millennium bug or the Y2K problem. As Rachel Greene noticed when she analyzed error-related works by early net.artists, some of these projects were actually "descriptions of the relationship between computer and user – a relationship in which routines of misunderstanding, breakdown and disappointment are typical and standard."[4]

The idea of making the most of technical limitations was discovered by net.art pioneers such as Jodi.org, Lisa Jevbratt, Vuk Ćosić, and others who benefited from the technical limitations of computers at that time. The *Non-Site Gallery* (1998) by Lisa Jevbratt (now, paradoxically, offline and represented by a plain "Error 404 Not Found" message) was an impressionist take on non-existing sites, network dead-ends and other technical mishaps of the 90s Web landscape. The even more explicit work *Error 404* (1997) by Jodi.org (still online) plays with various representations of the "Not Found" alert. As Alexander R. Galloway points out, "Jodi derives a positive computer aesthetic by examining its negative, its point of collapse."[5] The collapse is a key point in the way we can think of an error as a form of an accidental yet crucial change of any ongoing process. Also, there is still a difference

Sztuka i Dokumentacja nr 22 (2020) | *Art and Documentation* no. 22 (2020) • ISSN 2080-413X • e-ISSN 2545-0050 • doi:10.32020/ARTandDOC

between errors which occur in software and those which occur within hardware. Nevertheless, even a critical error may reveal surprising aesthetic and conceptual values, like the one present in the *Error 502 404 410* project (2012) by Marcelina Wellmer, a Berlin-based generative artist (fig.1). Her project, which was presented during Transmediale *2k+12 in/compatible* (2012), is founded on the premise of "What do computer errors sound like?" and is basically a sound installation based on the phenomenon of server errors and their audio signals. The discrete work of hard disk mechanisms becomes both an example of "reverse-engineering" and an attempt to translate between media. Although the disks turn in an endless loop, their rhythm is disrupted by the randomness factor. The obscure realm of data noise is revealed with the artist's methodical attitude and receives an aesthetic frame. As the disks perform their turns in a continuous loop of self-reference, the recursion is not always regular. In this project, Marcelina Wellmer approaches the issue of a server error by enhancing its audio qualities. Sounds indicating technical errors are normally not perceived in terms of aesthetics but rather alarm about a certain problem. In this artwork, the names of the particular errors that make the loop fail are legible only when the disk stops. It is a paradox that when we attempt to access the information about the work, we lose contact with it, and while we experience the artwork, we are unable to read the text. This cognitive dissonance is derived from reflection on errors as one of the most immanent features of the computer as a cultural machine. If software is a set of formal, language-based instructions prepared for the computer to follow and accomplish, this work negates the software's functionality.

As Inke Arns observes when analyzing the issue of experimenting with code, "It oscillates in the perception of the recipient between the assumed executability (functionality) and non-executability (dysfunctionality) of the code; in short, between significant information and insignificant noise."[6] This description seems to correspond with Marcelina Wellmer's idea quite well, particularly in another series by the artist, *Missing Files* (2012-2013), which consists of screens with digital images and a painted canvas that she cut into strips and crumpled on the floor or stored in grey plastic boxes (fig.2). The illegible remains of audio-visual projects are revealed and processed, so the categories change completely: both paintings and digital images lose their functionality, thus receiving different features. The processing of rejected and damaged components is a strategy of cultural garbology that is based on re-using the content of digital rubbish. As a result of recycling redundant data, both digital images and regular paintings are remediated and shifted into a new aesthetic dimension.[7]

Constructing an error

The growing interest in experimenting with digital images, generative art, processing and coding has an obvious side effect: many artists have noticed the beauty in chaos, even if it meant a failure of their creative attempts. The technical limitations, unsolvable problems and mistakes were so appealing that a genre of its own was formed: glitch art. The term itself, coined by Kim Cascone in relation to experimental music and the "aesthetics of failure" he noticed within, soon started to be used to describe other time-based arts such as video.[8] However, this term may still give rise to some inaccuracies, as Florian Cramer aptly notices: "Ironically, the use of the term 'post-digital' was somewhat confusing in the context of Cascone's paper, since the glitch music defined and advocated here *was* actually digital."[9] However, if the glitch could appear in the digital realm, it could be also be present in the post-digital sphere with only one key difference: in the latter it had to be artificially re-created instead of just happening accidentally. Soon it turned out that the formal and ontological differences mean less for artists than the real potential offered by embracing the 'aesthetics of failure' as a new language. The seminal glitch artist and theoretician Rosa Menkman refers to one of her projects, *The Collapse of PAL* (2010–2011), as a story because its narrative is based on a techno-nostalgic approach. As the artist explains, "In *The Collapse of PAL* (Eulogy, Obsequies and Requiem for the planes of

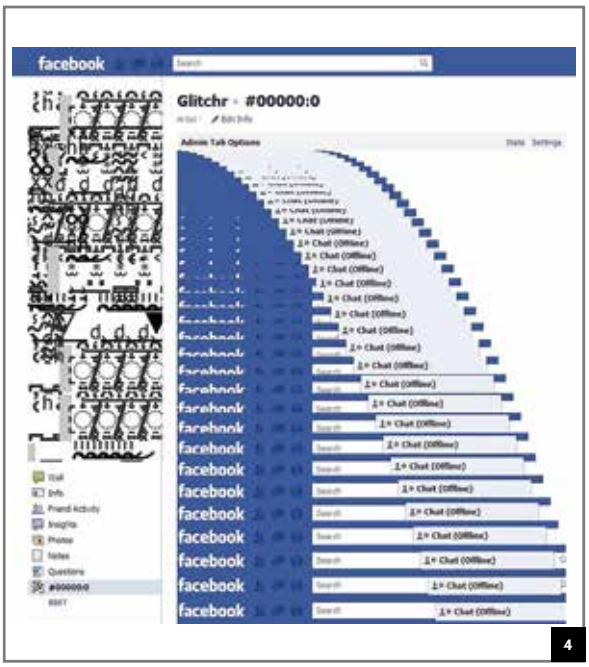
1


1


2

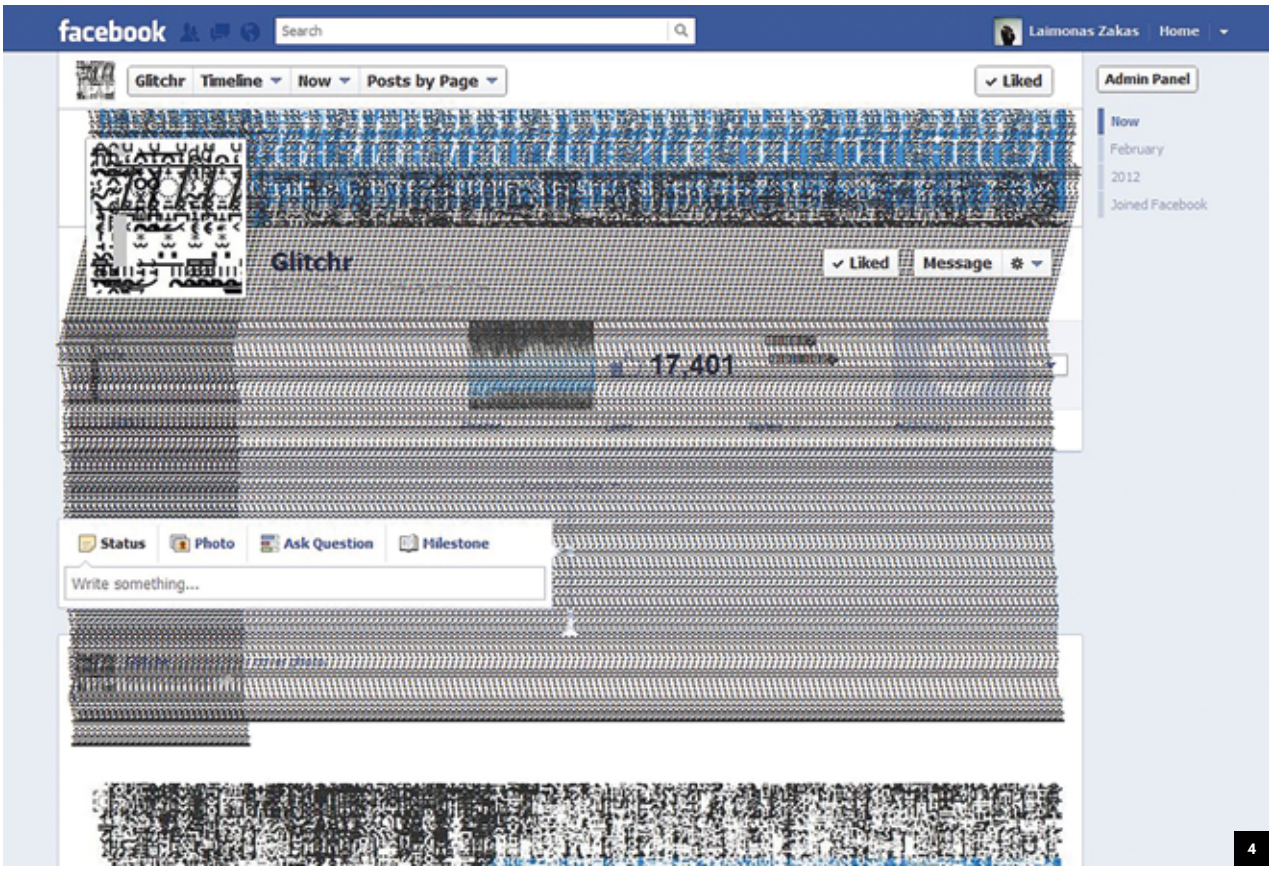

2


3

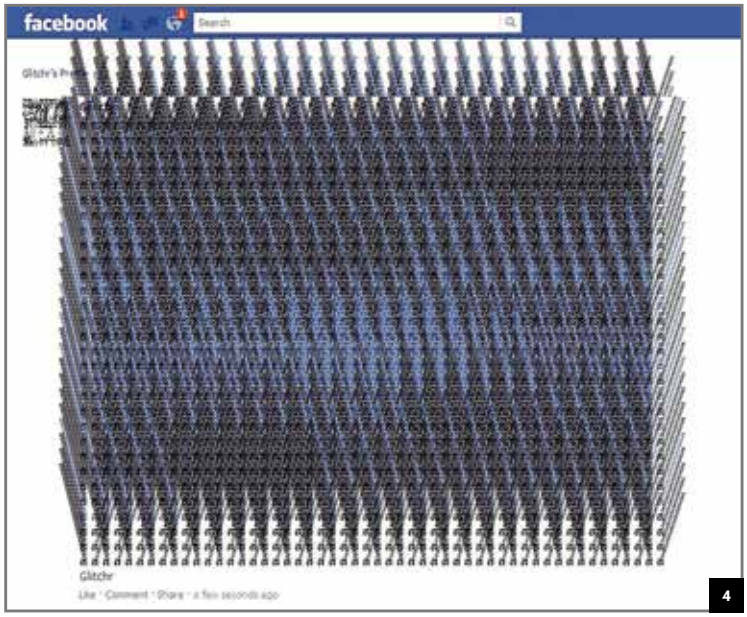


4

Sztuka i Dokumentacja nr 22 (2020) | *Art and Documentation* no. 22 (2020) • ISSN 2080-413X • e-ISSN 2545-0050 • doi:10.32020/ARTandDOC



4



4

1 . Marcelina Wellmer, *Error 502 404 410* (2012), technical cooperation: Gösta Wellmer. photo: Marcelina Wellmer, courtesy of the artist

2. !Mediengruppe Bitnik, H3333333K, public art piece, House of Electronic Arts Basel (2015), photo: Kathrin Schulthess, Basel, courtesy of the artists

3. Marcelina Wellmer, *Missing Files* (2012–2013), photo: Marcelina Wellmer, courtesy of the artist

4. Laimonas Zakas, *Glitchr*, screenshots (2012), courtesy of the artist

blue phosphor), the Angel of History (as described by Walter Benjamin) reflects on the PAL signal and its termination."[10] The PAL (Phase Alternating Line) system, as an analogue video encoding method that is now obsolete and no longer used, was remembered as a visual form that shaped the imagination of at least one generation of TV viewers. Menkman also recalls her collaboration with British generative artist Matthew Fuller that resulted in researching theories by Claude E. Shannon and Warren Weaver.[11] However, the list of her collaborators also includes people regarded as post-internet artists: Kim Asendorf or Rafaël Rozendaal. One of Menkman's early artistic inspirations was the *Untitled Game* project (1996–2001), which was based on the structural and visual deconstruction of the computer game Quake by the aforementioned net.art pioneers and her fellow country(wo)men Joan Heemskerk and Dirk Paesmans from Jodi.org. Eventually, Rosa Menkman not only worked with glitch in her artistic practice but also made an exploratory attempt to map the whole glitch art scene.

Since Rosa Menkman helped us perceive glitch art as an emergent art form in its own right, some essential changes have taken place. One of the key issues has been the general cultural tendency to shift from digitality back to materiality, which is enabled not only by the 3D printing hype, but also by the rising post-digital awareness. A whole wave of contemporary artists nowadays deals with so-called glitch art, using distortions that are results of errors in programming or, generally, in the digital origin of the images. We should mention the Australian sculptor Paul Kaptein, who uses aberrations of form in many of his works, e.g. *The Knowing* (2015). Sometimes not even the digital stage matters, but rather the in-between state that takes place in the process of remediation; in this case this is the materializing of an object that shows digital ontology but is implemented in the "real" (material) world. Also, during the creation process, particularly 3D printing, a technical slip-up may occur that causes the actual production of such an artefact. This is inspiring and may later be conjured purposefully.

This is why the spatial *Transformation of Mistakes into Truth*, to quote the title of Katarzyna Kujawska-Murphy's project from 2016 related to psycho-geographical implications of the architecture of Westbeth in New York City, has unexpected continuity in an error-based design of the House of Electronic Arts Basel. The designers of *H3333333K* (2015), Carmen Weisskopf and Domagoj Smoljo from !Mediengruppe Bitnik, who were inspired by glitches and errors in image loading, applied the idea to the solid matter of steel and concrete (fig. 3). This remediation resulted in a paradox: building a structure that should be stable, safe and useful but which contained an error since its genesis: the design process. The HeK façade reminds us about the digital origin of almost every item in contemporary visual culture and the invisible process of translation that is implemented in making the digital become reality. Although visual peculiarities in architecture date back to ancient Greek optical corrections, this attempt is rare and unique as it combines Marcel Duchamp's critique of 'retinal art' and forms of art that were 'art in service of mind', of which Duchamp approved.

What is exceptional for architecture is easier to apply in a post-digital way when it comes to textiles. American artist Margo Wolowiec uses glitch-inspired fabrics in her work, for example White Light (2014), which was inspired by the process of distorted communication: "when information is translated from one source to another, where meaning shifts and migrates, and data becomes malleable."[12] This description also characterizes the recently widely exhibited works of Faig Ahmet, an artist from Azerbaijan who combines very traditional weaving techniques and patterns with digital imagery, resulting in glitch-inspired rugs. One of his exhibitions, *Source Code* (Nov 2016 to Jan 2017) in the New York-based SAPAR Contemporary Gallery, consisted of colorful rugs hung on walls that looked like their patterns had melted or had been submitted to the forces of gravity. These objects are truly post-digital since the distorted, post-produced image is materialized by the means of traditional craft. This may be close to something that Koert van Mensvoort, one of the Next Nature Network scholars, named "boomeranged metaphors": the re-appearance of objects representing a digital

ontology in the material (offline) reality.[13] The post-digital (real) world is saturated with such links to ideas of digital (virtual) origin, even though the strict division between the real and the virtual is nowadays obsolete. Post-digital error is, therefore, a paradox: as is typical of the post-media way of thinking, designing and producing, it is the creation from scratch of a seemingly erroneous object whose idea comes from digital vocabulary that is treated as a starting point.

However, building an error instead of committing it and planning to produce even a minor mishap might sound like a paradox. Yet, this activity, which is undertaken by many of today's artists, reminds us that post-digitality extends so widely that an error needs to be purposely produced. Even if the concept of producing an object according to an erroneous and imperfect design might still sound unusual, glitch-inspired textiles and sculptural objects are increasingly popular. So unexpectedly interesting were these glitched 3D-printing results that a Flickr group was formed: "The Art of 3D Print Failure". Also, this genre is interesting when we think about its very origin – the Jacquard machine, which was recalled by Lev Manovich in his *Language of New Media* as the starting point of the computational trajectory that led to contemporary media culture.[14] Nonetheless, some of the visual aberrations enabled by digital postproduction software are merely – after the initial amusement has worn off – a sort of shallow play with visual structures. There are also still artists who are able to ask important questions and whose intention is not only to amuse their audience with some visual oddity.

Towards the post-digital collapse

One of the key features of the post-digital world is the crisis of physical space – its implosion of sorts – mainly due to the process of transferring businesses to the virtual domain. Public space becomes neglected, and to the young generation of contemporary 'screenagers' it might often seem like an imperfect version of the aestheticized, post-produced and Instagrammed world they mainly inhabit. This is why any error in the world of sleek and post-produced images seems to be (to recall the classic title of the 1956 collage by Richard Hamilton) "so different, so appealing."

The forecast of such an attitude was present as early as in Cory Arcangel's works, such as *Super Mario Clouds* (2002), for which the artist hacked a game cartridge, removed the chip responsible for the game's plotline, and left only the slowly moving white clouds on a blue background. Error was the purpose of his action: the game was rendered useless, but the unnoticed aesthetic values could be seen. A more contemporary example would be Jon Rafman, the Canadian artist famous for finding and recontextualizing images captured from Google Street View, but also a designer of glitch-inspired sculptural objects that were presented at the *Annals of Time Lost* (2013) exhibition in the Future Gallery in Berlin. The 3D-printed objects from the series *NAD (New Age Demanded),* such as *Ribbed Kandinsky* or *Crushed Stingel* (both 2012) as well as *Swerveman Black* (2013), recall the classical sculptural form of a bust on a pedestal; however, the image is conceived and created as already distorted. Nevertheless, what is a mere appropriation of a certain form gains critical meaning in a series of seemingly similar yet certainly different works by Zach Blas. In his *Facial Weaponization Suite* project (2011–14), the artist designed a series of masks based on some collective features associated with minorities that are submitted to various forms of oppression. These objects are designed to hide one's face (and therefore protect privacy) in the age of omnipresent surveillance cameras equipped with face-recognition algorithms. The masks are based on portrait photography, yet their amorphous shapes cover the facial features completely, thus making the mask-wearer free of involuntary exposure to biometric data harvesting. So, as portraits they are wrong, but as tactical objects they are perfectly right. Of course, this is a purely speculative design since these masks are not intended to be worn on a daily basis. Nevertheless, the project enables us to critically question the idea of the surveillance state and privacy violations using a misshaped, seemingly erroneous form. And since nowadays the internet is just another layer of public space,

the issue of protecting privacy is obviously related to social media.

Given that social media platforms unify the way in which their users behave and produce (verbal and visual) representations of their behavior, artists often react to the given format by hacking it. Early examples of Twitter-bound art are *crashtxt* or *reCAPCHAT* (both before 2012) by the allegedly French artist Jimpunk. The overabundance of Unicode characters and diacritic marks caused the artist's Twitter account to crash in a rather aesthetic manner. A similar concept is present in *Glitchr* (2011-2014) project that was designed by the Lithuanian artist and creative coder Laimonas Zakas as a form of glitch that causes some disturbances in the appearance of Twitter and Facebook layouts (fig. 4). Despite being "bold statements against the white walls of corporate unity,"[15] the Facebook version of the project was not actually banned or blocked by the platform's decision-makers; they have even encouraged the artist to continue with his experiments. The reaction of Twitter policymakers is unknown, but Zakas's minimalistic and formalistic tweets were described in popular media as weird. Using Unicode as his medium, Zakas managed to alter the look of the familiar social media platform in a way quite similar to that of Mark Napier's *Shredder* (1998), a net.art project that 'shredded' the layout of any website whose URL address was submitted. When asked to describe the genre of his project, Zakas explains that "It is performance art, as well as net art and site-specific art and even digital graffiti."[16] It is worth adding that an analysis with regard to visual poetry and Dada would probably also be surprisingly fruitful.

An intentional mistake, just like the one made by Dada poets a hundred years ago, reminds us that an imperfect message is less boring and also, in a way, less dangerous than a perfect, finished and faultless one; it may also reveal the conceptual framework of an apparently seamless structure. Also, as Hans Dehlinger puts it when describing his own experience with generative graphics: "From a technical standpoint, the whole thing is ridiculous; from an artistic standpoint, it is very interesting, though."[17] This is yet another feature of error-based artworks: they can be judged on criteria other than utility or practicality, thus helping us find aesthetic joy in the collapse of forms or intellectual reflection on watching a useless mechanism, as was practiced by Dadaists.

Moreover, from a language perspective, looking back at how language has changed due to the impact of computing on human culture, it seems that errors are related to machines, particularly those with artificial intelligence, namely non-human agents, but failures and misconceptions are rather a human thing. However, this dualistic, language-based division loses its sense when we apply the notion of the post-digital to what Koert van Mensvoort says: "Technology is the next nature."[18] This is why the omnipresent yet invisible contexture of the digital and material, avatars and bodies, screens and objects that we can see in post-digitality is no longer that simple.

To summarize, if we repeat Seneca's famous phrase that "to err is human" (*errare humanum est*), we should not forget its second part: "but to persist in error is diabolical" (*sed in errore perseverare diabolicum*). What is the devilish factor nowadays? Leaving behind the too obvious understanding that 'diabolical' means 'evil', we can consider it to basically mean 'non-human'. So how about a non-human agent from this point of view? The answer can partly be found when we ask another question, such as "who is responsible for a system error?" In the anthropophagical system-user relation, it is never the system itself. The system, which introduces itself as user-friendly, never takes responsibility for its crashes, errors and blind spots. It always blames the user for not updated software, not having the newest device or not behaving algorithmically. This asymmetrical relation is still there, even if we see a message like "we apologize for the inconvenience." No one really cares, and the system – as a non-human agent – is hardly a partner for negotiation.

Notes

[1] 'error,' in *Longman Language Activator* (Harlow: Longman, 1999), 852.

[2] Rudolf Frieling, "The Piece in the Country (Failure Piece #2) Dieter Froese," in *40Yearsvideoart.de – Part 1. Digital Heritage: Video Art in Germany from 1963 until the Present*, ed. Rudolf Frieling and Wulf Herzogenrath (Ostfildern: Hatje Cantz, 2006), 174.

[3] Justin Hoffmann, "DIY as a Counter-Strategy to Commercial Culture," in *Brilliant Dilletantes. Subculture in Germany in the 1980s*, ed. Leonard Emmerling and Mathilde Weh (Ostfildern: Hatje Cantz, 2015), 142.

[4] Rachel Greene, *Internet Art* (London: Thames & Hudson, 2004), 92.

[5] Alexander R. Galloway, *Protocol: How Control Exists After Decentralization* (Cambridge, MA: MIT Press, 2004), 243.

[6] Inke Arns, "Read_me, run_me, execute_me. Code as Executable Text: Software Art and its Focus on Program Code as Performative Text.," *Medien Kunst Netz*, http://www.medienkunstnetz.de/themes/generative-tools/read_me/, accessed 14.01.2020.

[7] The paragraph was based on a text written for Marcelina Wellmer's catalogue *Recent Works* and it is used here with the artist's kind permission.

[8] Kim Cascone, "The Aesthetics of Failure: 'Post-digital' Tendencies in Contemporary Computer Music," *Computer Music Journal* 24, no. 4 (2000): 12.

[9] Florian Cramer, "What Is 'Post-digital'?" in *Postdigital Aesthetics: Art, Computation And Design*, ed. David M. Berry and Michael Dieter (London: Palgrave Macmillan, 2015), 17.

[10] Rosa Menkman, "The Collapse of PAL," *Rhizome*, published electronically 31.05.2012 http://classic.rhizome.org/portfolios/artwork/54452/, accessed 14.01.2020.

[11] Rosa Menkmen, interview by Jason Huff, *Rhizome*, published electronically 14.01.2020 https://rhizome.org/editorial/2011/oct/20/artist-profile-rosa-menkmen/, accessed 12.05.2020.

[12] Margo Wolowiec, interview by DJ Pangburn, *Vice*, published electronically 12.02.2014, https://www.vice.com/en_us/article/d74zyq/wrap-yourself-in-glitch-with-these-colorful-digital-distortion-scarves, accessed 12.05.2020.

[13] Koert van Mensvoort, "Boomeranged Metaphors," *Next Nature Network*, published electronically 31.05.2009 https://nextnature.net/2009/05/boomeranged-metaphors, accessed 14.01.2020.

[14] Lev Manovich, *The Language of New Media* (Cambridge, MA: MIT Press, 2001), 22.

[15] Laimonas Zakas, interview by Nadja Sayej, *Vice*, published electronically 24.03.2014 https://www.vice.com/en_us/article/mgpv9a/glitchr-is-the-most-interesting-artist-hacker-on-facebook, accessed 12.05.2020.

[16] Ibidem.

[17] Hans Dehlinger, "Plotter, Plots, and Plotting – Why?" in *Digital Art*, ed. Wolf Lieser (h.f. ullmann: Königswinter, 2009), 72.

[18] van Mensvoort, "Boomeranged Metaphors."

Bibliography

Arns, Inke. "Read_me, run_me, execute_me. Code as Executable Text: Software Art and its Focus on Program Code as Performative Text." *Medien Kunst Netz* (2004). Accessed 14.01.2020, http://www.medienkunstnetz.de/themes/generative-tools/read_me/.

Cascone, Kim. "The Aesthetics of Failure: "Post-digital" Tendencies in Contemporary Computer Music." *Computer Music Journal* 24, no. 4 (2000): 12-18.

Cramer, Florian. "What Is 'Post-digital'?". In *Postdigital Aesthetics: Art, Computation And Design*, edited by David M. Berry and Michael Dieter, 12-26. London: Palgrave Macmillan, 2015.

Dehlinger, Hans. "Plotter, Plots, and Plotting – Why?". In *Digital Art*, edited by Wolf Lieser, 70-83. h.f. ullmann: Königswinter, 2009.

Frieling, Rudolf. "The Piece in the Country (Failure Piece #2) Dieter Froese.". In *40Yearsvideoart.de – Part 1. Digital Heritage: Video Art in Germany from 1963 until the Present*, edited by Rudolf Frieling and Wulf Herzogenrath, 174-177. Ostfildern: Hatje Cantz, 2006.

Galloway, Alexander R. *Protocol: How Control Exists After Decentralization*. Cambridge, MA: MIT Press, 2004.

Greene, Rachel. *Internet Art*. London: Thames & Hudson, 2004.

Hoffmann, Justin. "DIY as a Counter-Strategy to Commercial Culture." Translated by Matthew Partridge. In *Brilliant Dilletantes. Subculture in Germany in the 1980s*, edited by Leonard Emmerling and Mathilde Weh, 142-145. Ostfildern: Hatje Cantz, 2015.

Longman Language Activator. Harlow: Longman, 1999.

Manovich, Lev. *The Language of New Media*. Cambridge, MA: MIT Press, 2001.

Menkman, Rosa. "Artist Profile: Rosa Menkman." Interviewed by Jason Huff. *Rhizome,* Published electronically 20.10.2011. Accessed 14.01.2020, https://rhizome.org/editorial/2011/oct/20/artist-profile-rosa-menkmen/.

Menkman, Rosa. "The Collapse of PAL." *Rhizome*. Published electronically 31.05.2012. Accessed 14.01.2020, http://classic.rhizome.org/portfolios/artwork/54452/.

van Mensvoort, Koert. "Boomeranged Metaphors." *Next Nature Network*. Published electronically 31.05.2009. Accessed 14.01.2020, https://nextnature.net/2009/05/boomeranged-metaphors.

Wolowiec, Margo. "Artist Margo Wolowiec Turns Digital Errors Into Colorful Textiles." Interviewed by DJ Pangburn. *Vice*. Published electronically 12.02.2014. Accessed 17.05.2020, https://www.vice.com/en_us/article/d74zyq/wrap-yourself-in-glitch-with-these-colorful-digital-distortion-scarves.

Zakas, Laimonas. "Glitchr Is The Most Interesting Artist-Hacker On Facebook." Interviewed by Nadja Sayej. *Vice*. Published electronically 24.03.2014. Accessed 17.05.2020, https://www.vice.com/en_us/article/mgpv9a/glitchr-is-the-most-interesting-artist-hacker-on-facebook.