

Synthesizing A Stain; The Behaviour of Virtual Material,
how my files became things and my things became files.

Isaac van den Aker
2025

*In this thesis I will use the word “virtual” to describe (mostly digital) media-technologies, because in contrary to the word “digital”, it does not only include binary-based computational systems and tells more about something’s material condition. Like a digital image or video, you could describe shadows, symbols, echoes, thoughts or reflections as being virtual.

Introduction

We tend to think of physical and virtual environments as separate. This distinction, however—like disconnecting body from mind, form from content, or software from hardware—reflects broader human tendencies to separate the material from the immaterial. As technology becomes increasingly present in our environment, shaping our actions, perceptions and thoughts, this binary opposition becomes blurred. In this thesis I will search for where, why and how this boundary blurs.

As we shape technology, in turn it shapes us. And although this might seem more obvious for technologies that electronically translate virtual information into a physical output and vice versa, as we will see, even immaterial information, mediated by for example a screen, can be experienced as immediate or evoke a physical result.

This is not to say that virtual environments or media do not contain a (virtual) materiality themselves. Seemingly immaterial in form and embedded within programs, we will investigate which samples, codes and algorithms constitute virtual materials and their properties; could a screen deteriorate by virtual forces, what agency does the algorithm of an image possess and how can a file be synthesized into a video?

Our relationship with technology is shaped by certain normalized perceptions, like how a thing's assumed functionality dictates its value, or a lack of it. For example, how a crack in a phone's screen makes the whole device lose its perceived utility. But what happens when these views are destroyed? Can the phone with the cracked screen become a new thing on its own? How can we use technology's dysfunctionality, contradictions, destructive forces, instabilities or feedback loops, as constructive tools?

In this thesis, I am set to find a "thingness" of the virtual material. An object becomes a thing when it can no longer serve its common function, therefore I would argue that an object's thingness is its essential parts without functioning "correctly". Thus, thingness becomes visible in the dysfunctional.

The structures and properties of technology are of importance to me, because technologies shape the way we view the world, and open up perspectives. To me, that is exactly what art is about. It is the impossible attempt to distil such "thingness", to understand myself and the world around me. The result of this, the artwork, presents this attempt—a perspective, allowing the viewer to gain new understandings of how one perceives, could perceive, or experience new perceptions.

As I do not believe in the separation of the physical and the virtual, I do not believe that it is the hand that imposes its form onto matter, concept which dictates form, software versus hardware, but rather that all takes shape in an unstable dialogue with each other and the self—a self-referential feedback loop.

And so does this thesis, as it is a feedback system in both its form and content. The artworks, objects, technologies, media, materials, interactions, artefacts, perceptions, forces or concepts presented, described and questioned in this thesis could all be starting points for the creation of new artworks, objects, technologies, media, materials, interactions, artefacts, perceptions, forces or concepts.

Artefacts

An artefact is defined as anything created by humans that gives information about the culture of its creators. A tool, a chair, a vase, a painting, a screen, an image or an email, can all be considered artefacts—showing how (past) societies interact(ed) with their surroundings and each other. Next to interpreting an artefact's significance through its use case or cultural context, it can also be defined by its material properties. One of the methods used when analysing paintings or sculptures is X-ray fluorescence (Fig. 1), where the X-rays excite atoms within the artwork, causing them to emit secondary X-rays. These emissions reveal details about the underlying compositions of the artefact. (Fig. 2, Fig. 3) For example, when this analytic method was applied to *The Portrait of Isabel de Porcel* by the Spanish painter Francisco Goya, it revealed an overpainted layer of the painting by differentiating between the substances of paint. (Fig. 4)

During this analytic process, errors can occur due to scattering, where the X-ray is deflected from its intended path due to reflective materials inside the paint. This results in blurring and contrast shifting of the analysis. These errors can also be considered artefacts, in its second sense: a distortion in the representation of information, introduced by the involved equipment or techniques. The ambiguity of the two almost opposite definitions of the artefact is in itself an artefact of language.

A common form of technical artefacts are compression artefacts. Here data is being lost in compressing the image, but trying to reduce the size of an image also reveals something about its material properties. For example, the DCT algorithm (Fig. 5), used in JPEG images (Fig. 6), can reveal itself quite literally in block boundary artefacts or tiling. Here, the subdivision of the image into distinct blocks and the mathematical values that determine how each block is calculated and compressed, become visible. Not only do these visual traces of technical artefacts reveal how the algorithm constructs and compresses the image, they can also be an indication of the amount of change the image has undergone. As the German artist and writer Hito Steyerl points out in her essay *In Defense of the Poor Image*, this can yet again become a cultural artefact:

“The poor image has been uploaded, downloaded, shared, reformatted, and reedited. It transforms quality into accessibility, exhibition value into cult value, films into clips, contemplation into distraction.”¹

Indicating virality, the pooriness of an image becomes a new value. This method is also utilized by deepfried memes, where the amount of degradation is also used to convey a message, emotion and where meta-irony is used so that the confusion of the image in itself becomes the joke. The almost textural JPEG artefacts are used as gestures of rage, overstimulation and the delusions of being extremely online. In being meta-ironic, the distortion becomes the joke. These images contain technical artefacts which are made to be experienced. (Fig. 7)

¹ Hito Steyerl, "In Defence of the Poor Image", *e-flux journal* 10 (2009). www.e-flux.com/journal/10/61362/in-defense-of-the-poor-image/



Fig. 4. X-ray analysis being applied to bronze sculpture, *Boxer At Rest*, 330 to 50 BC,
<https://pubs.rsc.org/en/content/articlelanding/2014/ja/c4ja00107a/unauth>, Accessed 2 Apr. 2025.



Fig. 2. X-Ray analysis of a sculpture of Jesus, revealed it held real human teeth, <https://www.livescience.com/47407-jesus-statue-with-human-teeth.html>, Accessed 2 Apr. 2025.

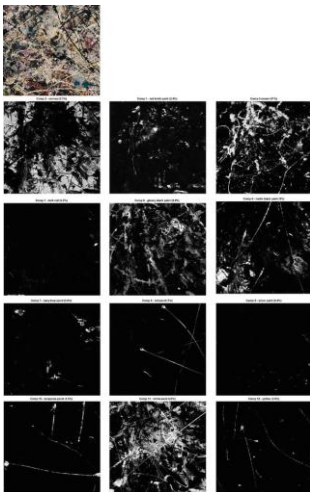


Fig. 3. Image of X-Ray Fluorescence analysis of Jackson Pollock's *Number 1A*,
pure.tudelft.nl/ws/portalfiles/portal/8929089/art_10.1186_s40494_016_0105_2.pdf, Accessed 2 Apr. 2025.



Fig. 4. Image of Goya's portrait of *Isabel de Porcel*, overlaid with the X-ray image of the same painting, overlaid by the watermark of alamy.com, an online platform for stock images, https://commons.wikimedia.org/wiki/File:Isabel_de_Porcel_by_Goya_%28X-ray%29.jpg, Accessed 2 Apr. 2025.

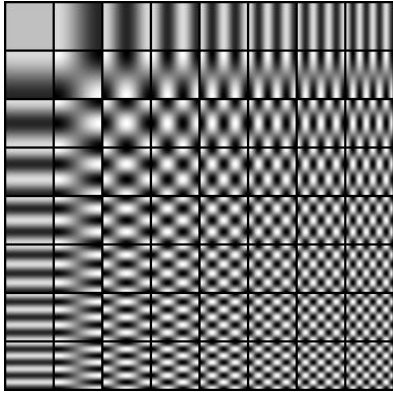


Fig. 3: A visual representation of all coefficients of the DCT (Direct Cosine Transform) algorithm. Used to create images in JPEG format, https://www.researchgate.net/figure/The-64-Basis-Functions-of-an-8-by-8-Image_fig3_363736653, Accessed 2 Apr. 2025.



Fig. 6. Jan Robert Leegte, *JPEG*, 2024, Generative images in JPEG file format.



Fig. 7. Deepfried meme of a horse staring into the abyss of the sea saying “man”, Uploaded by @DEEPFRIEDMEMEES x.com/DEEPFRIEDMEMEES/status/1333092739500695553, Accessed 2 Apr. 2025.

The Surface of Mediation

This experience of the material properties of a virtual environment, however, is commonly unwanted, as it disrupts the immersion these environments are anticipated to realise. But such a disruption can also reinforce immediacy, since it reveals a direct property of the medium at hand. As American media theorists Jay David Bolter and Richard Grusin describe in *Remediation: Understanding new media*, there is a common threshold within the design of the virtual; from transparency to opacity—immediacy to hypermediacy.² Transparency here, is a desire to erase mediation, an interface that should not be seen, looked through instead of at, so that the viewer can be fully immersed. As Bolter and Grusin point out: “Virtual reality is immersive, which means that it is a medium whose purpose is to disappear.”³

This view on media can be traced back to western traditions of painting, to the concept of the Albertian window, where through techniques of linear perspective and the seemingly non-existent brushstrokes, the surface of the painting dissolves and presents the viewer with a space “beyond” the canvas. It’s as if you’re looking through a window.⁴ A compression artefact would thus account for a **crack** in the glass, and reveal its surface.

Opacity or hypermediacy on the other hand, is an intentional uncovering of this surface. A confirmation of mediation which could in turn lead to an even more immediate experience. A windowed interface, one displaying different information in multiple windows, for example, “...does not attempt to unify the space around any one point of view. Instead, each text window defines its own verbal, each graphic window its own visual, point of view.”⁵ This method is used by Russian artist Olia Lialina in the work *My Boyfriend Came Back From the War*, where she uses this horizontal display of information and multiplicity of windows as an interactive, non-linear narrative device. (Fig. 8)

By presenting itself as an interface instead of trying to dissolve, users are in a more direct contact with its mechanisms: “*The multiplicity of windows and the heterogeneity of their contents mean that the user is repeatedly brought back into contact with the interface.*”⁶ Which is to say that this return accounts for interaction—with each click of the mouse, a new layer of programming erases the previous, and with each new layer of programming, control is given back to the user, and so on.⁷ By being opaque, hypermediacy can feel like a direct connection with the medium, which in turn could make the mediated feel immediate. Here it becomes clear that opacity and transparency are not opposites or exist on their own, they exist within a mixture of confusions to enhance the user’s authentic experience.

These authentic experiences are based on familiarity—pattern recognition. Here remediation takes hold: what used to be a physical newspaper has now become a news app on a phone, while its content has stayed more or less the same.⁸ And in turn, the design of the physical

² J. David Bolter and Richard Grusin, *Remediation: Understanding New Media*, (Cambridge: MIT Press, 1999): 20.

³ Ibid., 21.

⁴ Ibid., 29.

⁵ Ibid., 33.

⁶ Ibid., 44.

⁷ Ibid., 33.

⁸ Ibid., 39.

newspaper adapts forms from its virtual descendants, and starts to look more and more like a windowed computer interface. Remediation is a constant effect within the search for immediacy, where one medium represents, refashions or absorbs the other, which in turn creates a feedback loop where one can no longer distinguish the iterations of remediation.

Italian artist duo Eva and Franco Mattes illustrate what happens when the remediated becomes confused in their work *Half Cat*. (Fig. 9) *Half Cat* is a sculpture that is a materialized version of a LOLcat meme; an image of a cat with two legs and no ears walking down a street (Fig. 10). The description of the work on their website states:

“The deformation was initially believed to be caused by a technical error in Google Street View. However, users on online forums eventually discovered the original photograph of a four-legged cat strolling down a street in Ottawa, Canada. It was revealed that the image was not a glitch but a deliberate edit designed to mimic a technological error, suggesting that accidental tech failures can appear more compelling than intentional Photoshop edits.”⁹

Here, the remediated is not only the obvious: a cat turned into an image or a virtuality turned into a sculpture. What’s also being remediated is the intentional accident, an error of automation imitated by a human. Here the technical artefact, again, becomes a cultural one. Later Eva and Franco Mattes remediated this work as a deepfried image (Fig. 11), printed on heavyweight blotting paper, traditionally used to soak in liquid LSD.¹⁰

⁹ Eva and Franco Mattes, “Half Cat”, 2020, <https://0100101110101101.org/half-cat/>, Accessed 3 Apr. 2025.

¹⁰ Eva and Franco Mattes, “Deep Fried Half Cat”, 2024, <https://0100101110101101.org/deep-fried-half-cat/>, Accessed 3 Apr. 2025.

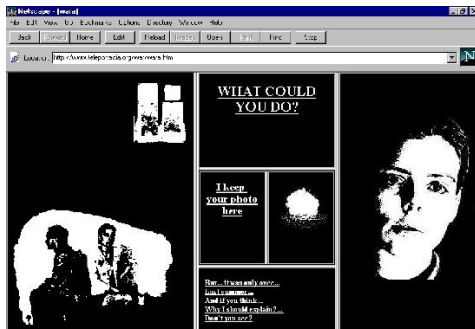


Fig. 8: Olia Lialina, *My Boyfriend Came Back From the War*, 1996



(Fig. 9. Eva and Franco Mattes, *half cat*, 2020



Fig. 10. Original image of half cat, source unknown.



Fig. 11. Eva and Franco Mattes, *deepfried half cat*, 2024

Material Agency

In the interaction with systems that operate between transparency and opacity, and where forms morph, confusions emerge. Especially when these erased surfaces become embodied. In the 1967 film *Playtime*, by the French director Jaques Tati, such a semi-transparent world is where the protagonist, Monsieur Hulot, finds himself. In its most literal sense, almost all buildings are made entirely out of glass windows and neither the viewer nor Hulot can distinguish inside from outside (Fig. 10). But there are more invisible forces at play. Materials and objects seem to guide people into unexpected directions. In the first part of the film, for reasons unknown to the viewer, Hulot is set to fill in some kind of form. He finds himself in an office building, where nothing is what it seems. For example, when Hulot steps into what seems to be a niche in the wall, trying to understand some abstracted diagram hanging there (Fig. 11), the niche turns out to be an elevator and Hulot is unwillingly transported up to the top floor, making him miss his appointment. In the world of *Playtime*, definitions lose outlines, objects shift their meaning based on context or perspective, they work in exactly the opposite of expectations, turn out to be something else entirely or leave a unforeseen trace on their users. Doors turn out to be walls, the pattern of marble is mistaken for a roadmap (Fig. 12), buildings reflect onto each other (Fig. 13) and spiralling neon signs guide you right back where you came from (Fig. 14).

The objects and their material properties become actors in the network of the city, and like a virtual environment, present, guide and mislead the human-actors with interfaced interactions. The film is a rich exploration of examples that show how seemingly non-living actors can possess agency and invoke a change.¹¹ As British anthropologist Tim Ingold describes it: *“If persons can act on objects in their vicinity, so, it is argued, can objects ‘act back’, causing persons to do what they otherwise would not.”*¹²

In *Seven Days*, an experimental film by Canadian filmmaker Chris Welsby, non-human actors have taken over production all together. The film shows a timelapse of a landscape, recorded over seven days (Fig. 15). British sociologist Andrew Pickering describes the film, saying that:

“Most obviously, it is a visual (and sound) record of changing atmospheric conditions. But its key feature is that the orientation of the camera was controlled not by Welsby but by the sun. The camera tracked the sun through the sky; when the sun was out, the camera pointed at the ground; when clouds obscured the sky, the camera pointed upwards. Here, then, material agency—the elements, the sun, the weather, the rotation of the earth—rather than the artist, created the work, and the work speaks directly to us of the agency of nature rather than that of the human...”¹³

The machines in this film also possesses agency. Via a system of feedback loops they operate on what to capture. But the machines are not to be seen. In Spanish artist Mario Santamaria’s *The Phantom of the Mirror* (Fig. 16), another kind of automated camera produces an image. The previously invisible machine that captures Google Street View images, accidentally captures itself in a mirror, resulting in a self-portrait of the machine. In both *The Phantom of the Mirror* and

¹¹ Allard Amelink and Peter-paul Verbeek, *Podcast filosofie: Bruno Latour*, Centre Erasme, (2021).

¹² Tim Ingold, “The Textility of Making”, *Cambridge Journal of Economics* (9 July 2009): 94.

¹³ Andrew Pickering, “Cybernetic Art,” draft manuscript for *The Bloomsbury Encyclopaedia of New Media Art* (2021): 3.

Seven Days, machines capture moments that would not take shape without them. Mechanical interpretations of the patterns in the atmosphere and ghostly reflections of the machine are both self-portraits of their mechanisms.

Seven Days highlights a distinction between the material circumstances of natural forces and those of the human-made systems that attempts to interpret and keep up with them. The passing of clouds and the rotation of the Earth are elemental forces—self-sufficient and indifferent. The camera mounted on its robotic equatorial stand, however, interprets these elements, and by doing so exposes a certain rhythm they possess. It is only through documentation and interpretation that these forces can be assigned to such a form.



Fig. 10. Screenshot of Jacques Tati's *Playtime*, 1967.



Fig. 11. Screenshot of Jacques Tati's *Playtime*, 1967.



Fig. 12. Screenshot of Jacques Tati's *Playtime*, 1967.



Fig. 13. Screenshot of Jacques Tati's *Playtime*, 1967.



Fig. 14. Screenshot of Jacques Tati's *Playtime*, 1967.

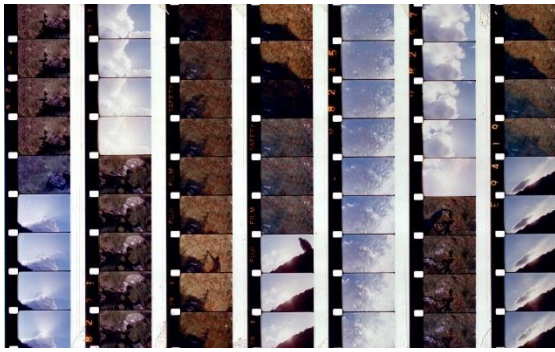


Fig. 15. Film strip of Chris Welsby's *Seven Days*, 1974.



Fig. 16. Mario Santamaria, *The Phantom of the Mirror*, 2013.

Synthetic Formlessness / Virtual Matter

Without interpretation, elementary forces would be formless—lacking structure, information, and identity.¹⁴ For humans there is an inability to deal with formlessness. This inability is for example evident in the ganzfeld effect which can be evoked by a sensory deprivation (Fig. 17). When senses are exposed to unstructured information, such as white noise, the brain starts hallucinating, amplifying neural noise, in an attempt to impose meaning on the lack of perceptual information. The American artist James Turrell utilizes this effect to disorient the viewers perception. In his work *Aural*, he creates a formless space, by lighting a room uniformly and rounding of its corners, he erases any edges of its structure, making the space feel depthless (Fig. 18). Such disorienting effects, however, are not limited to an absence of information; excess can also blur definition. Apophenia, for example, is the tendency to perceive meaningful connections between unrelated phenomena—recognizing patterns in noise¹⁵ (Fig. 19).

Virtual environments, although the media they incorporate might seem solid and outlined, could be considered such a formless field of noise. Since virtual media, may it be, sound, image, video or a website, are essentially all built on the same computational principles, that is binary numerical representation, they can be transformed into- and combined with each other.¹⁶ Due to this infinite recombination of media, their outlines lose definition.¹⁷ (Fig. 20) The works in the series *Substrate*, by German Artist Thomas Ruff, visualises such a loss of definition. By combining images found online and multiplying them with each other, an image that is “more or less devoid of meaning” is created.¹⁸ (Fig. 21)

One of these rudimentary computational principles is defined by the Austrian and French writers Ingrid Hoelzl and Remi Marie, as the being of a programme. As they point out in *The Soft Image*, “The image is not only part of a programme, but also contains its own ‘operation code’: it is a programme in itself.”¹⁹ This applies not only to images but to all forms of virtual media—sound, text, video, websites. Next to this, they explain that these operations are being performed continuously. Even an image that appears still, that visually seems constant, is continuously updated and refreshed—recalculated.²⁰

Recombination and calculation are possible since virtual media are fragmented into samples, where physical media consists out of a constant, more solid material. For example, a physical photograph is consistent in material, where a JPEG image is subdivided distinct blocks. Even though a photograph might seem granular, it is not as if each grain is a discrete individual unit. This is what artist and writer Lev Manovich calls this the *fractal structure of new media*:

¹⁴ Georges Bataille, “Formless,” *Documents* 1 (Paris, 1929): 382, translated by Allan Stoekl, Carl R. Lovitt, and Donald M. Leslie Jr., in *Georges Bataille: Vision of Excess. Selected Writings, 1927-1939* (Minneapolis: University of Minnesota Press): 31.

¹⁵ Robert T. Carroll, “Apophenia”, *The Skeptic's Dictionary*, Last modified 2016, skeptidic.com/apophenia.html, Accessed 3 Apr. 2025.

¹⁶ Lev Manovich, *The Language of New Media* (Cambridge: MIT Press, 2002): 49–50.

¹⁷ Jos de Mul, “The Work of Art in the Age of Digital Recombination,” in *Digital Material*, ed. Marianne van den Boomen et al. (Amsterdam: Amsterdam University Press, 2009): 99–102.

¹⁸ Thomas Ruff, “Substrate”, 2001, <https://www.thomasruff.com/werke/substrate/>, Accessed 3 Apr. 2025.

¹⁹ Ingrid Hoelzl and Rémi Marie, *Softimage: Towards a New Theory of the Digital Image* (Chicago: The University of Chicago Press, 2015): 4.

²⁰ *Ibid.*, 3.

“Media elements, be it images, sounds, shapes, or behaviours, are represented as collections of discrete samples (pixels, polygons, voxels, characters, scripts). These elements are assembled into larger-scale objects but they continue to maintain their separate identity.”²¹

Due to any media element being a collection of discrete samples that are a numerical representation, elements can be (re)interpreted by different tools / software, making for the loss of a single defined form.²²

In the YouTube video *The Sounds of Microsoft Paint*, by user Sleeping Lugia, the raw data of the iconic drawing tool *Microsoft Paints* program file, is reinterpreted as sound and video. Because this data is the architecture of the program, certain parts of its framework, its computational structures, can still be recognized in such an audiovisual translation, resulting in distinct algorithmic patterns and shapes. At certain moments, even some visual elements of the software, e.g. the icons of the paintbrush, bucket tool and eraser, become visible, revealing how these components are embedded within the raw data itself. (Fig. 22)

Here the architecture of the program and the software used to interpret it, decide the form of outcome. (Fig. 22) When manually creating a such a form via software however, its interactivity also plays a role. Using Microsoft Paint to draw a straight line, would for example be way more difficult than doing so in Adobe Illustrator. This is not just because the tools one can use within the program are different, but also due to the material properties the software is able to interact with; one alters independent pixels, the other linked vectors.

Like how the objects in *Playtime* change and direct people’s behavior, and the machine in *seven days* dictates form, agency of the material properties of media, programs and software influence their form, behavior or outcome. (Fig. 22) Upon creating, one can follow this material rather than impose a preconceived form onto it. As Ingold states: “*the forms of things arise within fields of force and flows of material. It is by intervening in these force-fields and following the lines of flow that practitioners make things.*”²³

²¹ Lev Manovich, *The Language of New Media* (Cambridge: MIT Press, 2002): 51.

²² Lev Manovich, *The Language of New Media* (Cambridge: MIT Press, 2002): 56.

²³ Tim Ingold, “The Textility of Making”, *Cambridge Journal of Economics* (9 July 2009): 91.



Fig. 17. Participant in a ganzfeld experiment, https://en.wikipedia.org/wiki/Ganzfeld_experiment, Accessed 2 Apr. 2025.



Fig. 18 James Turrell, *Aural*, 2025.



Fig. 19. Image of potato chips' looking like Jesus weburbanist.com/uploads/2010/05/Jesus-in-Food.gif, Accessed 2 Apr. 2025.



Fig. 20. Sam Lubicz, *Impersonal Mass I*, 2021-2022.

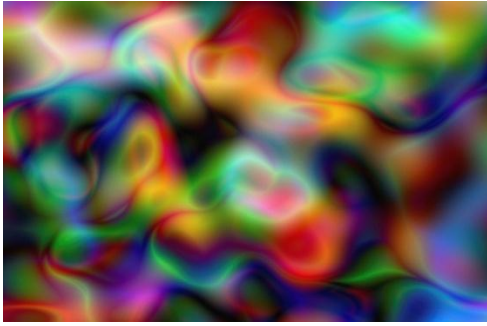


Fig. 21. Thomas Ruff, *Substrat 31*, 2001, *Substrate Series*.



Fig. 21. Image digitally simulated photographic grain, www.grubbasoftware.com, Accessed 2 Apr. 2025.

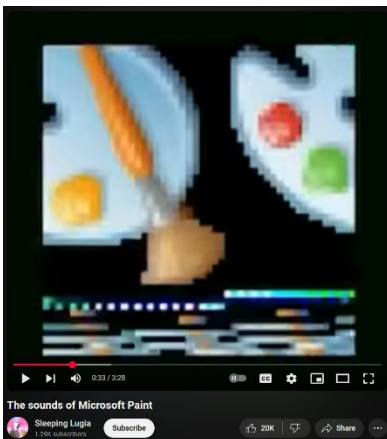


Fig. 22. Screenshot of YouTube video revealing *Microsoft Paint*'s app icon, Uploaded by Sleeping Lugia, www.youtube.com/watch?v=NFe0aGO9-TE&t=33s, Accessed 2 Apr. 2025.

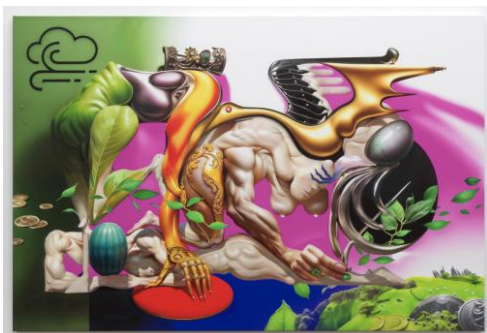


Fig. 23. K vin Bray, *Less they touch the ground and more they decide for it*, 2023. "Kevin bray tries to understand how the form and language of particular software and various mediums are visualized and how they can be potentially manipulated into other ways of functioning." Quoted from www.upstreamgallery.nl/artists/95/kevin-bray, visited 2 Apr. 2025.

Base Material / Decomposition

Following the properties attributed to virtual media above, the being of a program can be considered a foundation to these media. This is not to say it is stable, since this foundation is always in motion. It could be compared to something Georges Bataille would describe as *base material* — formless, unstable, and abject, quickly disregarded and yet essential to its designated form. (Fig. 24) The big toe, for example, is one such thing Bataille regards as base material—the most human part of the human body, making it possible for us to stand upright.²⁴

“The big toe cannot be eliminated by the high because the high depends on it, and it torments our 'light head' contemplating the heavens with the nagging reminder of its presence by, in an example Bataille suggests, the pain of corns.”²⁵

Just as our ability to contemplate depends on the toe, software depends on hardware, the virtual image is constructed from the program, and vice versa. In virtual environments, moments where the immediate experience ceases to exist, are considered abject. Like when artefacts or glitches (Fig. 25) surface, exposing the system. They are not just abject because they disrupt immersion and distort desired information, but also because they indicate a malfunctioning of the system, which could stop it from functioning entirely. The glitch rejects functionality, like the Dutch artist Rosa Menkman states: *“The glitches I trigger turn the technology back into the obfuscated box that it already was.”²⁶*

Where Menkman uses the disruptive forces of the glitch as an explanatory and constructive tool (Fig. 26), true disruption happens without intent. Decay, the process of decomposition, is one such instance where disruption and abjection occur unintentionally. However, the breakdown of material is not always obvious in virtual media. In physical media, the tool that produces and the product it creates are separated, whereas in virtual media, they are entangled. If a camera decomposes, it does not affect a picture already taken with it. But when a computer's hardware deteriorates, so does its program or image. A literal example of this is bit rot, where the magnetism of a hard disk degrades, altering the stored data.

Yet decomposition in virtual media is not limited to its physical components. In the early net art piece *Scrollbar Composition* by Dutch artist Jan Robert Leegte, the decay of form occurs through changes in software. (Fig. 27) Although these changes are made by human actors, the artist himself has no control over them. The appearance of the work is dependent on the operating system and browser that is being used, and adapts to updates.²⁷

Where once, the scrollbars were the main visual element of the work, they are now only visible when hovering over the box they're assigned. (viewed on Firefox, Windows 11, 2 Apr. 2025) The form of the work, like with *seven days*, is shaped by forces outside of the work itself. Agency becomes ambiguous and is shared by the artist, the software developer, the machine which displays and the software itself. While in this work the artist intentionally deploys these different actors and the agency they possess as conditions that create form, this process could also happen without intent or control and become destructive.

²⁴ Benjamin Noys, "Georges Bataille's Base Materialism," *Journal for Cultural Research* 2, no. 4 (1998): 500,503.

²⁵ Ibid., 501.

²⁶ Rosa Menkman, *Glitch Studies Manifesto*, (Amsterdam/Cologne, 2009/2010): 8.

²⁷ Jan Robert Leegte, *Scrollbar Composition*, <https://www.digitalcanon.nl/artworks/jan-robert-leegte/#list>, Accessed 3 Apr. 2025.



Fig. 24. An image of dirt, en.photo-ac.com/photo/2508681/black-moist-soil-texture-background, Accessed 2 Apr. 2025.



Fig. 25. Melanie Willhide, *Little Boy Blue* 2000, 2011, to *Adrian Rodriguez* Series, The work displays the recovered data from stolen computer, which resulted in a glitch.

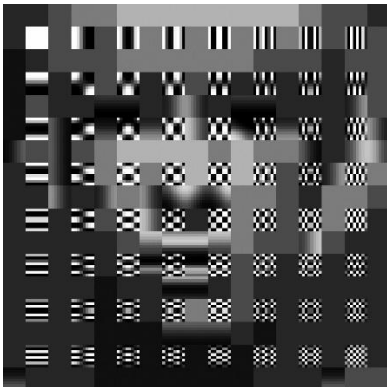


Fig. 26. Rosa Menkman's, *Self-Portrait with DCT*, 2023.

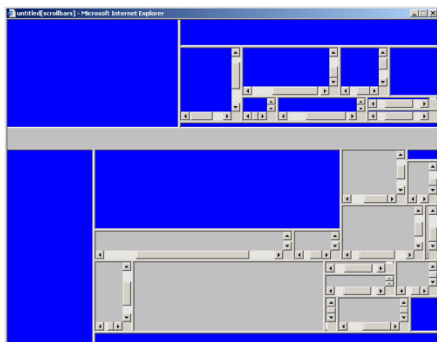


Fig. 27. Jan Robert Leegte, *Scrollbar Composition*, 2000.

Virtual Breakdown / Self-Referential Feedback Loops

In the YouTube video “Have I Wasted My Life Making YouTube Videos???” uploaded by FranLab (Fig. 28), Fran Blanche describes the pessimism and existential questions she’s left with after receiving an email from YouTube stating that they will start deleting any channel that has been inactive for more than two years. Uploading video’s every day for more than a decade, the email makes her doubt that if what she has been doing is actually of any value, since all the work she put into it will probably be deleted within two years after her death. She explains how she has to maintain her upload schedule to make a living, while her videos have to adapt more and more to an algorithmic force beyond her control and understanding.²⁸ Like a self-referential feedback loop—where a systems output is routed back into its input, creating an endless cycle—the video becomes reflexive; content questioning its own existence.

Like Blanches video, Stan Brakhage’s film *Mothlight* (Fig.29) derives from a same kind of loop of frustration. The film is made by directly affixing the wings of death moths between two strips of tape, leaving an imprint—an indexical trace of what was once present—behind on the film screen. In an interview, Brackhage reflects on the film’s creation:

“...These crazy moths are flying into the candlelight, and burning themselves to death, and that's what's happening to me. I don't have enough money to make these films, and ... I'm not feeding my children properly, because of these damn films, you know. And I'm burning up here ... What can I do?" I'm feeling the full horror of some kind of immolation, in a way.”²⁹

By immortalizing the wings which enabled the moths to fly towards their own death, Brackhage constructs via destruction. He does so also literally, as he says himself: “The grief was helpful in squeezing the little film out of me...”³⁰ The projector light shining through the film tape, reveals the moths while simultaneously recalling the way they are destroyed, reflecting Brackhage’s own relationship to the film.

This self-referential feedback loop, where something both creates and destroys itself, can also emerge within material properties, for example, with a screen burn-in: a permanent decline in brightness of certain parts of a screen. (Fig. 30) In this process the continuous display of an image slowly degrades the light emitting diodes, leaving behind an inverted ghost-image. While a virtual image is often perceived as immaterial and disembodied, the phenomenon of the ghost-image reveals a tangible agency, demonstrating that its effects can be distinctly physical. Even though the content of a screen is always refreshed, its image recalculated, and its virtual environment seemingly immaterial, the ghost-image leaves behind a sustained physical trace of what was once virtually present.

Like visual traces of an algorithm in a JPEG reveal how the image itself is constructed, so does the screen burn-in display the material architecture of the screen. Next to being a technical artefact, it is also a cultural one, disclosing how this object has been interacted with. The ghost-image reveals elements of the content that has been displayed and how this content repeats itself. By using a screen to continuously display a news channel for example, the

²⁸ Fran Blanche, “Have I Wasted My Life Making YouTube Videos???” YouTube video, 6 Nov. 2024, <https://www.youtube.com/watch?v=b2moF09lChI&t=886s>, Accessed 3 Apr. 2025.

²⁹ Stan Brakhage, commentary on *By Brakhage: An Anthology, Volume 1*, directed by Stan Brakhage (Criterion Collection, 2003)

³⁰ Ibid.

channels' logo or layout elements, like a news crawl, are most ubiquitous and static and thus more likely to cause well defined burn-in. On a smartphone, this would be the elements of the graphical interface, for example navigation icons. (Fig. 30) Almost as if self-referential, in both cases a hazy human figure, blurred by its movement, can be seen in the centre of the screen, mirroring its viewer.

The loop between software and hardware shows us how their material and virtual properties are not distinctly separate, but deeply entangled and affected by each other. The self-referential feedback loop is at the base of all things virtual and the ways we create, interact with and perceive them. Agency alternating between human and machine, the interaction between them, deepfried memes, signal emerging from noise, ghost images, the remediation of media or the constant re-calculation of virtual forms, all rely, operate or emerge from such loops. As self-referential feedback loops continue to generate and amplify artefacts, they, in turn, become the foundation for new loops. When artefacts surface, cultural or technical, they inform us on the innerworkings of their systems. To see this, is thus to see the structure of the loop, a starting point of iteration, a different perspective, a nonduality, an artefact.



Fig. 28. Screenshot of YouTube video, Uploaded by FranBlanche, <https://www.youtube.com/watch?v=b2moF09lChI&t=885s>, Accessed 2 Apr. 2025.



Fig. 29. Stan Brackhage's, *Mothlight*, 1963, Image of Filmstrips.

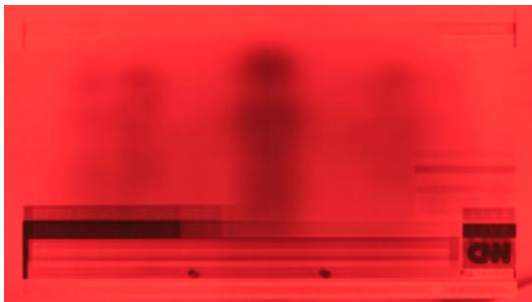


Fig. 30. Image of a screen-burn in, www.avforums.com/threads/poll-has-your-oled-tv-suffered-burn-in-note-your-vote-will-be-public.2197134/page-36, Accessed 2 Apr. 2025.

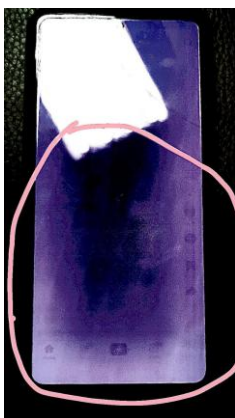


Fig. 30. Image of a screen-burn in of a phone screen, www.reddit.com/r/mildlyinfuriating/comments/1ezb0ru/my_lil_brothers_phone_screen_has_tiktok_burnt_in/, Accessed 2 Apr. 2025.



Fig. 31. Video Feedback, From the cover of Douglas Hofstadter's book *I am A Strange Loop*, 2007.

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