Digital Avantgarde

Table of Contents

Preface

New media art, or digital art or computer art, also known as unstable media art is at the core of my artistic practice. Rephrasing the V2 Unstable media manifesto (1987), my artistic practice uses electronic waves, frequencies, engines, sound, light, video, sensors, and computers. All those media have an inherent instability, embracing that instability is what makes them challenging yet interesting to me[1].

In an environment like the DogTime at the Rietveld Academy unstable media is present on paper but not on practice. In my year, and years ahead, in my opinion there is no more than a handful of persons that embrace unstable media in their artistic practice. Most of my classmates focus on fine arts[2], like painting, sculpture, installations, video[3] and mix media in general, all collected on the DogTime terminology of "Expanded Painting". Some embrace performative elements and digital media usually does not go beyond video. Even in these cases, in general the artwork is "static", there is no interaction, and the viewer is most of the time dissociated with the work.

This has led me to search on how to reconciliate the view of unstable media and computer art with the more traditional forms of "Expanded Painting" that I see at the Rietveld. This is the aim of this thesis. For this I will use the Avantgarde artistic movements as theoretical framework. It is my hypotheses, that unstable media art is the natural evolution of the avantgarde into the digital age of information.

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[1] I will base my definition of media art in the V2 Unstable Media Manifestos. This line is rephrasing part of the manifesto version of 1987.

[2] I define fine arts as "art objects" that are static and do not change with the viewer. As we will later see, those are essential characteristics to unstable media and computer art.

[3] I take video that is used to document, illustrate, depict something, as fine arts. More generally a video that is just set up in a loop repeating the same images is just a digitalization of the frame used to display pictures. As far as the video is a static object and does not embrace or mutates with the spectator it is to me just a collection of static images hence in the same level of painting, illustration, or photography.

Introduction

Nowadays we live in a world where most our interactions are mediated by technology. We could argue about the positive and negative aspects of this digitalization or propose alternatives for those developments but unless there is a radical change at a global scale digital is here to stay.

In the landscape of contemporary art, the emergence of digital technologies has not only transformed artistic practices but also challenged the conventional structures of art institutions. This thesis delves into the intricate relationship between contemporary digital art and established art practices and institutions. We unravel the dissonance through the lens of lessons learned from avantgarde movements. As we navigate this exploration, it becomes apparent that the principles once championed by avantgarde pioneers' clashes are actual and alive on the establishment of digital art and art practices reacting against the established institutional frameworks that aim to house and legitimize artistic endeavours.

To comprehend the contemporary discord, we first turn to the lessons imparted by avantgarde movements. These radical artistic endeavours, born out of a fervent desire to break from tradition, questioned the very essence of art's autonomy, art institutions and the role of art in the praxis of life. Our journey begins with an exploration of how these movements sowed the seeds of rebellion against established norms, challenging the existing order and laying the foundation for a discourse that continues to resonate today.

The first chapter follows the historical context of avantgarde movements. Here we set the stage for an in-depth exploration of the clash between contemporary digital art and established art institutions, drawing inspiration from the rebellious spirit of avantgarde movements. By revisiting the principles of autonomy, institutionalization, and the societal role of art, we aim to understand the profound shifts that have accompanied the digital age. The subsequent chapters will delve into the specific challenges posed by unstable media, the digitalization of life, and the emergence of a new "digital creative practice."

Central to our inquiry is the concept of the autonomy of art, a principle cherished by avantgarde visionaries, juxtaposed against the institutionalization of art. The first sections illuminate the tension between the inherent freedom of artistic expression and the institutional structures that seek to categorize, validate, and often, stifle innovation that gave fruitful soil to the historical avantgarde movements to develop. The clash between the avantgarde spirit and institutional expectations sets the stage for our examination of digital art's place in the contemporary art world.

To comprehend the disjunction, we delve into the multifaceted relationship between art, the status quo of society and everyday life. As we unravel these interconnected threads, it will become evident that avantgarde art challenges not only institutional norms but also societal expectations, inviting us to rethink the role of art in our daily lives. Those challenges will come back when we look at digital art in the contemporary world.

As we venture further into the realm of contemporary art, the second chapter on "Unstable Media" beckons our attention to the transformative impact of digital technologies on artistic expression. The term "unstable media" encapsulates the dynamic and ever-evolving nature of artistic practices influenced by digital tools and platforms. This chapter serves as a first bridge between avantgarde ideals, and the unprecedented possibilities brought forth by the digital age.

We follow into the core of this thesis that is the chapter on computer art. This chapter, laden with illustrations and case studies, seeks to unravel the intricacies of unstable media and computer art compared to traditional forms. Through the examination of practical differences, conceptual paradigm shifts, and illustrative examples, we embark on a journey that lays the groundwork for understanding the nuanced relationship between contemporary digital art practices, the institutional frameworks that seek to encapsulate them, paradigm shifts that accompany the digitalization of artistic creation.

Embedded within the exploration of unstable media is an inquiry into the digitalization of life itself. The increasing interdependence between art and technology prompts a revaluation of our understanding of artistic objects and their place in an environment saturated with digital stimuli. We get inspiration from the film "Ghosts in the Shell" as we navigate the intricacies of identity, existence, and the transformative power of the digital realm. This will delve into the profound implications of the cyborg metaphor. Donna Haraway's proclamation that "we are all cyborgs" becomes a guiding principle, inviting reflection on the symbiotic relationship between humans and technology. This interconnectedness extends beyond mere tools and engenders a new perspective on artistic creation, where the boundaries between artist and medium blur into a collaborative dance.

To contextualize the paradigm shifts brought about by unstable media, we scrutinize the practical differences between computer art and traditional forms. Three distinct shifts from traditional art practice emerge, each challenging established norms and inviting a redefinition of artistic processes and outcomes.

We illustrate this with the work of Vera Molnar, an artist who navigated the transition from the imaginary realm to the tangible, marrying the ethereal possibilities of digital creation with the materiality of the real machine. This illustrative case study encapsulates the transformative journey from concept to manifestation within the realm of computer-generated art.

As we traverse the chapter, the distinctions between digital art objects and their traditional counterparts become increasingly pronounced. We scrutinize both the practical and conceptual disparities, shedding light on how the advent of digital technologies has reshaped not only the materials and methods of artistic creation but also the very essence of what constitutes an artistic object.

At the heart of this exploration lies a redefinition of the artist and their role in the creative process. The emergence of the new "digital artist" challenges conventional notions of authorship, craftsmanship, and the tangible marks of the creator on a "canvas". Digital tools

usher in a paradigm where the artist is mediated by technology but becomes itself a mediator, orchestrating algorithms and manipulating code to breathe life into virtual canvases.

With the artist and their practice evolving, the very nature of the artistic object undergoes a profound shift. No longer confined to a static canvas or a sculpted form, the "digital art object" is dynamic, interactive, and mutable. We dissect the conceptual underpinnings of this shift, exploring how digital art objects challenge the viewer's traditional expectations of permanence, singularity, and the sanctity of the original.

Embedded within this exploration is a reflection on the relationship between digital art practices and the avantgarde movements of the past. While avantgarde artists sought to break free from traditional constraints, contemporary digital artists face similar challenges while navigate a frontier where the boundaries between the virtual and the real blur, opening up new avenues for experimentation, innovation, and a redefinition of artistic autonomy.

We illustrate this with Rafael Rozendaal's exploration of the internet as a canvas. His work serves as a poignant illustration of the transformative shifts mentioned in the chapter. His digital artworks, accessible to anyone with an internet connection, challenge the traditional notions of art consumption, distribution, and ownership. The internet becomes both the medium and the exhibition space, democratizing access to art in ways inconceivable within the confines of traditional art institutions.

As we navigate the evolving landscape of digital art creation, the question of originality becomes a focal point. In the realm of digital art, replicability is not a flaw but a feature.

We have one final chapter to probe into the challenges posed by the digital age to the traditional concept of originality, exploring the dichotomy between the myth of originality in traditional art and the replicability inherent in the digital realm.

Traditional art often romanticizes the notion of the singular, irreplicable masterpiece, elevating originality to mythical proportions. However, within the digital age, where copies are exact and infinitely reproducible, the very foundation of this myth is questioned.

We point out how the commercial dimensions of digital art, delving into the rise of NFTs (Non-Fungible Tokens) are bringing digital art back into the traditional frameworks that it aimed to disrupt.

We close with some personal final remarks on my own practice and my take on the digital avantgarde.

Avantgarde movements

In this chapter I will provide (historical) context to the avantgarde view on aesthetics, art objects and art practice in general. The aim of this chapter is to clarify the theoretical concepts that will be used during this thesis.

The Wikipedia entry on the avantgarde defines it "as a genre of art, an experimental work of art, and the experimental artist who creates the work of art, which usually is aesthetically innovative, whilst initially being ideologically unacceptable to the artistic establishment of the time." (Wikipedia 2014-2023)

We should keep this definition in the back of our mind, as a general idea. However, this is not the main definition we will use because it has at least two challenges for our argumentation. On the first place, the definition is too broad. If we follow that any artistic expression outside of the mainstream falls under the avantgarde umbrella. This would imply that any art object using innovative media would fall under the avantgarde, as we will later see, this is not the case. On a second place, this definition does not illustrate the ideals and motivations of the avantgarde movements.

I will follow "Theory of the Avantgarde" by Peter Burger (Burger 1984) and "Historische Avantgarde" by Ferdinand Drijkoningen et. al. (Drijkoningen, et al. 1991) to gather the understandings of the theory of Avantgarde that will be used during this thesis.

The first thing to understand with the Avantgarde It does not refer to one artistic movement. The Avantgarde encompasses a group of artistic movements that are considered innovative for their time[4].

Paraphrasing the introduction of (Drijkoningen, et al. 1991), we can say that chronologically speaking, the first wave of Avantgarde movements is from before World War II. This wave came to a halt in the mid-1930s. This wave is referred as the *"Historical Avantgarde"* and encompassed artistic movements like Dada, Surrealism, Futurism, Constructivism, among others.

New Avantgarde impulses then emerged at the end of the 1940s and the beginning of the 1950s, giving rise to a second wave that has been referred to as the *"neo-Avantgarde"*. Some of the movements in this new wave include Pop Art, Conceptual Art, Kinetic Art, Feminist Art, Minimalism, Fluxus, among others.

It's important to note that avantgarde principles can vary significantly between different movements and periods. Some movements, such as Dada and Surrealism, may embrace absurdity and irrationality, while others, like constructivism, prioritize structure and interdisciplinarity. Nevertheless, overarching themes of avantgarde art are:
- Reaction to the autonomy of art (Burger 1984),

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[4] For this perspective the Wikipedia definition is accurate yet not concrete enough as it does not explain why avantgarde movements are innovative.

- rejection to art institutionalization (Drijkoningen, et al. 1991),
- challenging the status quo in art and society (Burger 1984) and (Drijkoningen, et al. 1991),
- the role of art in the everyday life (Burger 1984),
- and a commitment to innovation and experimentation (Wikipedia 2014-2023).

Other principles usually related to Avantgarde art but that we will not discuss in detail here are: Radicalism, Interdisciplinarity, social and political engagement, rejection of tradition, democratization of art, and engagement with technology.

The core avantgarde subjects

I will now proceed to describe and illustrate the core avantgarde subjects that will make the common thread of this thesis. Any art movement that claims to be avantgarde ought to at least address the subjects presented here.

The autonomy of art

The concept of the autonomy of art refers to the idea that art should be self-contained, self-referential, and independent of external influences, particularly those of politics and society. It implies that art should be valued for its own sake, without the need for it to serve a specific function or purpose in society.

According to (Burger 1984), Chapters 2 and 3. The idea of the autonomy of art, particularly the notion of *"art for art's sake"*, gained prominence during the rise of bourgeois society in the 18th and 19th centuries. It reflected a desire to separate art from utilitarian and practical functions. This concept aligns with the values of the emerging bourgeois or middle-class society, which valued individualism, self-expression, and the pursuit of aesthetic pleasure. Art was then seen as a realm where individuals could freely explore their creativity and emotions. In particular, Peter Burger points out that the raise of the individual independent artist coincides with the appearance of the private art collector. As a follow up this, the autonomy of art also played a role in the development of cultural capital. Art, especially in the form of fine arts and high culture, became a marker of social status and education among the bourgeois class.

Peter Burger points out, (historical) Avantgarde artists rejected the notion of art's autonomy, arguing that it had become an isolated and elitist pursuit within bourgeois society. They sought to break down the barriers between art and everyday life. Movements, such as Dada and Surrealism, believed that art should not exist in isolation but should actively address pressing concerns. Therefore, they engaged with political and social issues and challenged the bourgeois order.

[Illustration]

Art institutionalization

The developments on the autonomy of art also gave raise the "autonomous art institution".

Ferdinand Drijkoningen quotes Bourdieu as follow: *"…the process of art's autonomization correlates with the emergence of a distinct societal category of art producers. These producers are increasingly inclined to recognize only those rules that have been handed down by their predecessors, which can either serve as a starting point or be the rules they choose to break. Over time, they become more capable of shedding any societal servitude, whether it be related to moral censorship and aesthetic programs imposed by a proselytizing Church, or academic control and demands from a political authority that seeks art as a propaganda instrument. In other words, just as the emergence of law as law, i.e., as an "autonomous domain," is associated with the advancing division of labor leading to a community of professional jurists, the process that leads to the constitution of art itself is accompanied by a change in the relationships that artists maintain with non-artists and, as a result, with other artists. This change leads to the formation of an intellectual and artistic field that is relatively independent and to a related development of a new definition of the artist and their art"* (Drijkoningen, et al. 1991, 16)[5].

In other words, the autonomy of art is not only about the art object itself but also follows that the institutions around it became autonomous itself. More precisely, following (Drijkoningen, et al. 1991, 15), and institution is defined as *"an organized system of goal-directed activities"*. There for by an "autonomous art institution" we mean "an organized system of goal-directed activities for art", where art is then defined by the institution itself.

For example, a guild of painters that is guided by this belief no longer paints for the functional purpose of painting, e.g., decoration for the Church, but for its internal rules and purposes.

A more modern illustration of this would be the situation with Art galleries which only address art as defined by them. Another example is the Rietveld Academy itself;

"The Rietveld Academie is a small-scale, independent and internationally oriented university of applied sciences for Fine Arts and Design in Amsterdam (NL)." (Rietveld 2023)

Ferdinand Drijkoningen (Drijkoningen, et al. 1991, 23-26) claims that the rejection to these *"autonomous art institutions"* is a core element of all avantgarde movements.

In the case of the historical avantgarde movements he describes the following four patterns of reaction to art institutions:

1. **Total Rejection:** A first and most radical view, is the rejection of any form of institutionalization. *Dadaists* rejected the traditional art world and organized anti-art exhibitions and performances in defiance of established art institutions. Their work was often characterized by absurdity and anti-establishment sentiment. For example, Marcel Duchamp *"Fountain"* (1917), is a urinal signed with the name "R Mutt". Fountain is one of the most iconic art pieces of the 20th century, representing a

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[5] translation by chatGPT

major shift in the function of art in society. It is one of the earliest examples of *"readymade"* sculptures. We will come back to this example in the next section.

2. **Alternative uses:** A second view of the place of art in the social order is one in which a different role is assigned to the institution of art than was the case at that time. It has already been pointed out that institutions form a hierarchical structure: certain institutions can encompass the whole of institutions, often not without conflicts. *The Surrealists* aimed to challenge the conventional understanding of reality and art by exploring the unconscious mind. They sought to disrupt traditional norms through dreamlike and provocative works. For example, Rene Magritte *"La Trahison des Images"* depicts a pipe with the text under "this is not a pipe". With this he introduces self-reference into the work which challenges the relation of the art object with its environment.

3. **New order:** A third view engage in a radical battle with the existing institution of art and aim for a "new order," a complete upheaval in the social order. This movements speak of the "integration of art and social life" and the "aestheticization of life". *The Italian Futurists* aimed to break with traditional artistic norms by introducing radical changes that would embrace the industrial age, technology, speed, and the dynamism of modern life.

4. **Change of perspective:** A fourth strategy focuses on the artwork and the associated beliefs: this is where the rupture with everything previously done and thought in this field lies. These alternative artworks and beliefs will bring about a revolution in the institution of art, which will automatically have repercussions elsewhere in the social order. *The Constructivist* movement aimed to create a new visual language that was in sync with the rapidly changing social and technological landscape of the early 20th century. The *"Staatliches Bauhaus"* (1919-1933) combined craft, fine arts and living style on its educational program. The influence of the Bauhaus is still seen today in several areas of design, art and architecture (DW Documentary 2019).

On the neo-avantgarde movements we also see other type of reactions to institutions for example:

5. **Creating Alternative Spaces:** Some avantgarde movements opted to create their own alternative art spaces, such as artist-run galleries, performance venues, or publications. These spaces allowed them to showcase their work without the restrictions of traditional institutions and often fostered a sense of community and collaboration among artists. *The Situationist International* sought to create alternative situations and experiences through art and activism. They organized events, such as "psychogeographic" explorations of cities, outside the confines of traditional art institutions.

6. **Anti-Commercial Stance:** Many avantgarde movements resisted the commercialization of art and were critical of the art market. They viewed art institutions as complicit in this commodification and believed that it compromised the integrity of artistic expression. *The Street Art and Graffiti* artists often work

outside the commercial art world, using public spaces as their canvas. They resist art market pressures by creating art that is accessible to a wider audience and often anonymous.

7. **Desire for Inclusivity:** Some avantgarde movements, particularly those with political or social agendas, aimed to make art more inclusive and relevant to the general public. They often sought to challenge the elitist nature of art institutions and advocated for greater accessibility and diversity in the arts. The *Black Arts Movement* This cultural and political movement aimed to make art more inclusive and relevant to the African American community. It sought to challenge the elitism of traditional institutions and promote art as a means of cultural expression and social change.

8. **Temporary and Site-Specific Works:** Some avantgarde artists created temporary or site-specific artworks that defied traditional museum or gallery settings. These works were often meant to exist outside of the institutional framework, challenging the idea of art as a permanent, collectible object. *Land Art (Earth Art)* make works that do not fit in the traditional premises of an art institution. For example, Marinus Boezem *"De Groene Kathedral" (1996)* consists of trees planted in such a way that they replicate the cathedral of Reims. Such large-scale, site-specific is not meant to be collected or displayed in traditional art institutions but were integrated with the natural environment.

<picture>

9. **Collaboration and Interdisciplinarity:** Avantgarde movements have frequently embraced collaboration and interdisciplinarity, working with artists from various fields and challenging the separation of art forms within institutional structures. As mentioned before, The *Bauhaus school* promoted collaboration among artists, architects, and designers, breaking down the divisions between art disciplines. This interdisciplinary approach challenged traditional educational and institutional structures.

10. **Reappropriation and Appropriation:** Some avantgarde artists have reappropriated or appropriated elements of art institutions' collections or spaces as a form of protest or to question the role of institutions in shaping artistic value. Elaine Sturtevant pioneered a movement called *Appropriation Art* by appropriating/copying her contemporary male artists. For example, with her work *"Haute Tension"* (1969), she copied a homonymous work by Martial Raysse from 1965. With these actions she recontextualized existing art, gender constructs, the concept of originality and commercial imagery of the moment. A clear challenge to the discourse lead by art institutions.

<picture>

11. **Institutional Critique:** Some avantgarde movements engaged in "institutional critique" as a form of art itself. This involved creating artworks that directly questioned and challenged the practices, politics, and ideologies of art institutions.

Hans Haacke's work often explores the politics and economics of art institutions. His piece "Shapolsky et al. Manhattan Real Estate Holdings, a Real-Time Social System, as of May 1, 1971" investigated the financial interests of an art gallery.

Art and the status quo of society,

In the previous two sections, we followed (Burger 1984) and (Drijkoningen, et al. 1991) where they argue that one of the intrinsically motivations of the historically avantgarde movements was reaction to the raise of the bourgeois society and the autonomy of art and autonomous art institutions. We also suggested that several other neo-avantgarde movements also had a similar reaction to the autonomy of art and its institutions. This brings us to a third common characteristic of avantgarde movements; namely the challenge of the status quo.

Let's recall some of the steps that lead to *"Fountain"* by Marcel Duchamp and the concept of non-art. For this we should go back to the nineteen century Paris had the "Salon des Beux-Arts".

The "Salon des Beux-Arts" was the central institution to define art at their time. The salon defined art essentially as tableaus[6] and anything that would not fit this will not be considered art. Such institutionalisation mean that the career of several artists depended on the decision of the jury of the Salon. This induced several protests of refused artist and attempted alternatives, but they had little effect. In 1863, Napoleon III granted the refused artist an alternative exhibition space, the *"Salon des Refuses"*. But even with the emperor blessing this had the opposite effect than expected:

"It is a mistake, then, to read the Salon des Refusés as an "alternative" exhibition and as the glorious revenge of the avant-garde against academicism: The public flocked to the Refusés mainly to laugh at the rejected works, and in many instances the crowd was right. As the critic Jules-Antoine Castagnary wrote in L'Artiste, "Before the exhibition of the Refused, we were unable to figure out what a bad painting was. Now we know it." (De Duve 2014)

In 1884, the Société des Artistes Indépendants was founded. The Société's no-jury rule implicitly contained the a priori admission that anything a member would present counted as potential art.

"What the Société did not foresee, even though it logically followed from its no-jury rule, was that a betrayal of said rule automatically amounted to the denial of the rejected work's potential art status. Whatever the Société refused to show would ipso facto be tossed into the limbo of non-art, where it would keep company with Le Bain, Masked Ball at the Opera, and all the other paintings that had been banned from public view over the years because

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[6] *"Tableau is used to describe a painting or photograph in which characters are arranged for picturesque or dramatic effect and appear absorbed and completely unaware of the existence of the viewer"* (TATE sd)

the Salon jurors could not, would not, admit that the works were tableaux worthy of the name." (De Duve 2014)

However, even of no-jury rule, Marcel Duchamp's *"Nude Descending a Staircase (No. 2)"* was expelled from the 1912 Salon des Indépendants. Hence as mentioned above, qualify as non-art. The rejection was *"presumably for not being a tableau cubiste worthy of the name"* (De Duve 2014)

After such events, Marcel Duchamp moved to New York where he witnessed the creation of American of the New Yor Society of Independent Artist in 1917. Where he was part of the board. Again, planned an exhibition with no-jury rule.

Duchamp then submitted the piece *"Fountain"* under the pseudonym R. Mutt.

"Objections, on both esthetic and moral grounds, were immediately voiced, and an emergency meeting of the society's directors was called to decide whether R. Mutt's contribution was to be accepted. Heated arguments were heard from opposing viewpoints before the issue was finally put to a vote" (De Duve 2014)

The piece was not publicly exhibited. Still generated discussions that are followed even nowadays. *"Fountain"* challenges the status quo on several layers. (De Duve 2014) presents the following: When an urinal is art, anything can be art, any one could be an artist, the monopoly of "independent art institutions" create in the art practice.

Such reactions to the status quo did not stop with the historical avantgarde. We can also see it in neo-avantgarde movements.

For example, Elaine Sturtevant pioneered a movement called *Appropriation Art* which consisted of appropriating/copying other artist's work. We will look more into this in the last chapter also in the perspective of digital art.

In 1969, Elaine Sturtevant replicated Martial Raysse's 1965 artwork, "Haute Tension." Through her work, Sturtevant challenges several aspects of the status quo.

At the first place, Sturtevant challenges the prevailing belief of her time, which emphasized technique as the paramount aspect of art. She contends that neither the visual concept nor the execution holds the primary value; instead, it is the artist's intention that lies at the core of the artwork. Consequently, deliberately reproducing an artwork can still result in a piece of significant artistic value, worthy of inclusion in institutions like the Stedelijk Museum in Amsterdam.

In a second place, she challenged the gender bias of her time. At her time, all[7] works in museums and galleries were by male artist. Moreover, by copying several other works by

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[7] Perhaps there were other female artists exposing at her time, but the important point is that the art world was even more male dominated that what it is now. Something that has not improved much as it is shown by the work of the Guerrilla Girls; women are still fighting their place in the art society, and many have become an artistic PR icon [guerrilla girls] for the institutions to show "diversity".

male artist she illustrated that there was a gender bias and was not only the technique or concept of the art piece.

The Stedelijk museum proved her right by showing both works on side of each other in its permanent collection.

Also, the art market proved her right. Several of her pieces have sold for more than the original piece. In 2007, an original *Crying Girl* by Roy Lichtenstein sold at auction for $78,400; in 2011, Sturtevant's canvas reworking of *Crying Girl* sold for $710,500.

Art and the everyday life

The cases of Elaine Sturtevant and Duchamp show how an artist can integrate their practice into the reality they live in. This brings us to the fourth common characteristic of avantgarde movements that we will use during this thesis. Namely, the position of art in in the everyday life.

More explicitly, a common characteristic of avantgarde movements is the integration of artistic practice in the praxis of life.

In the case of the Bauhaus, they advocated for the integration of art into the everyday life. This well illustrated in their manifesto:

"Architects, sculptors, painters – we all must return to craftsmanship! For there is no such thing as "art by profession". There is no essential difference between the artist and the artisan. The artist is an exalted artisan." (Gropius 1919)

These ideas led to the design of functional and aesthetically pleasing objects for everyday use. Two famous examples would be the Wassily Chair by Marcel Breuer and Door Knob by Walter Gropius which can be still found nowadays. Even more, the influence of the Bauhaus in the design of everyday objects can still be seen on how there is a general attention for good design on everyday objects.

As shown in the DW documentary on the Bauhaus [reference], the integration of art in the everyday life was also seen on the Bauhaus teaching method that replaced the traditional pupil-teacher relationship with the idea of a community of artist working and living together. As described by The DW Its aim was to bring art back into contact with everyday life, and architecture, performing arts, design, fashion and even parties were therefore given as much weight as fine art.

Section summary

In this section we illustrated how the historical avantgarde and neo-avantgarde movements challenge to the autonomy of art influenced cultural change, including a shift away from traditional notions of art as an isolated, purely aesthetic pursuit, and institutions surrounding it. They advocated for art to have a more engaged, politically aware, and socially relevant role in society. This perspective played a crucial role in shaping the direction of

avantgarde art in the 20th century and beyond. The impact of this perspective is still felt nowadays.

I intentionally avoided any mention to technology, computers and digital media and the avantgarde movements because that connection will be discussed in the next section.
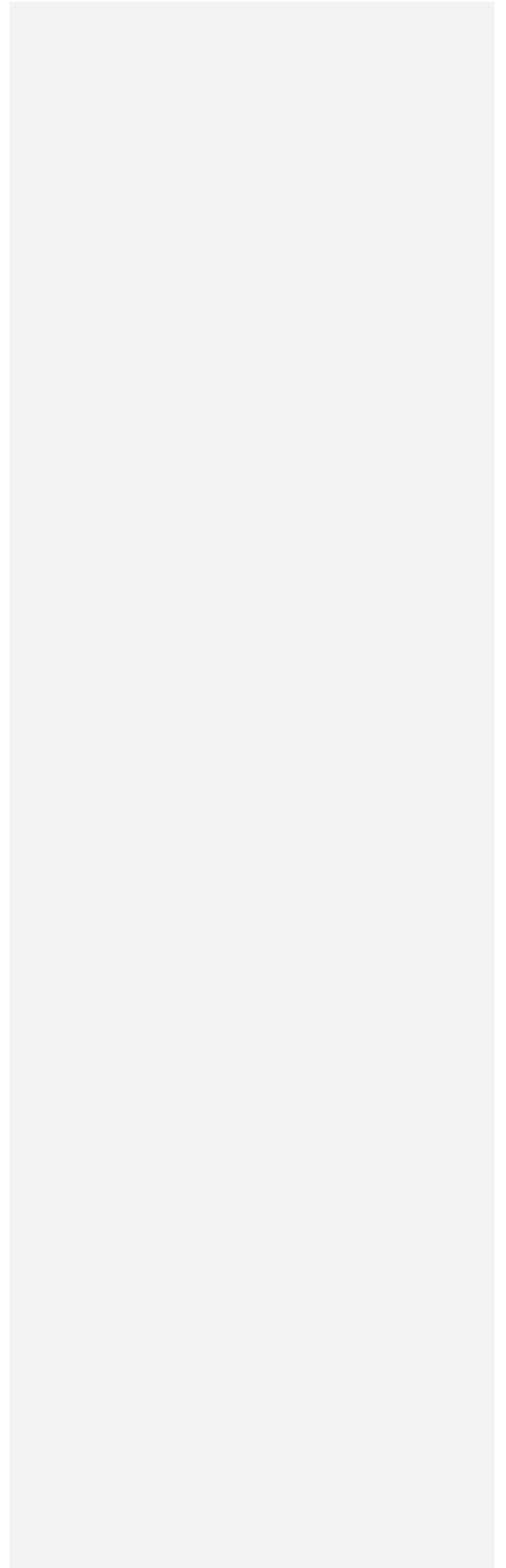
Unstable Media

In this chapter, I will briefly summarize and define what I mean with unstable media and related terms.

Broadly speaking, "Unstable Media Art" is used to describe a category of contemporary art that incorporates technology and digital media as integral components of artwork. Following the Unstable Media Manifesto (V2_ 1987), a first define unstable media as follows:

 Unstable media is *"…all media which make use of electronic waves and frequencies, such as engines, sound, light, video, computers, and sound. Instability is inherent to these media.*

Quantum mechanics has proved, among other things, that the smallest elementary particles, such as electrons, exist in ever-changing forms. They have no stable form, but are characterized by dynamic mobility. This unstable, mobile form of the electron is the basis of the unstable media.

The unstable media are the media of our time. They are the showpieces in our modern homes. We promote their comprehensive use, instead of the often practiced misuse of these media…"

Then V2_ goes into the possibilities of unstable media

"…the unstable media move within the concepts of 'movement-time-space', which implies the possibility of combining more forms and contents within one piece of work. The unstable media reflect our pluriform world.

Unstable media are characterized by dynamic motion and changeability, this in contrast with the world of art which reaches us through the publicity media. This has come to a standstill and has become a budget for collectors, officials, historians, and critics…"

Illustration, Light-Space-Modulator

At a first glance, it may seem that unstable media is related to computers and digital media. However, this is not a necessary to make an unstable media artwork. Let's take the example of the "Light-Space Modulator" (1930) by Laszlo Moholy-Nagy. Here is a description of the work by Moholy-Nagy himself:

"This piece of lighting equipment is a device used for demonstrating both plays of light and manifestations of movement.

The model consists of a cube-like body or box, 120 x 120 cm in size, with a circular opening (stage opening) at its front side. On the back of the panel, mounted around the opening are a number of yellow, green, blue, rot, and white-toned electric bulbs (approximately 70 illuminating bulbs of 15 watts each, and 5 headlamps of 100 watts). Located inside the body, parallel to its front side, is a second panel; this panel too, bears a circular opening about

which are mounted electric lightbulbs of different colors. In accordance with a predetermined plan, individual bulbs glow at different points. They illuminate a continually moving mechanism built of partly translucent, partly transparent, and partly fretted materials, in order to cause the best possible play of shadow formations on the back wall of the closed box. (When the demonstration occurs in a darkened space, the back wall of the box can be removed, and the color and shadow projection shown on a screen of any chosen size behind the box.)

The mechanism is supported by a circular platform on which a three-part mechanism is built. The dividing walls are made of transparent cellophane, and a metal wall made of vertical rods. Each of the three sectors of the framework accommodate a different, playful movement study, which individually goes into effect when it appears on the main disc revolving before the stage opening.
The first sector's playful movement study: three rods move jerkily (since the plan of the edges and base are somewhat different) on an unbroken path. Different materials, translucent screening, parallel horizontal rods, and wire netting are mounted to the three rods.

The second sector's playful movement study: found within three levels arranged one behind the other is a large immobile aluminium disc; moving up and down in front of this is a small, bent and highly-polished perforated brass disc; at the same time—between the two—a small ball is set in motion as if on a roller coaster.

The third sector's playful movement: a glass rod topped by a spiral of glass. This describes, in the reverse, the movement of the pin of the large disc, whose tip touches the base made of a diagonally-arranged and sector-shaped glass disc, levitating over a reflecting circular platform.

This piece of lighting equipment can be used to arrive at countless optical conclusions, and it seems correct to me that the development of these attempts be continued as planned, as a way to approach the designing of light and movement." (Moholy-Nagy sd)

An important point to notice here, is that the Light-Space-Modulator artwork is not only the sculptural (physical) object but also how that object interacts with the space. When the "Light-Space-Modulator" is turned on, the different pieces move and then reflect the light in the room creating abstract forms and movements over the surfaces of space where the piece is located. Since space and light on it are not stable, the "Light-Space-Modulator" intentionally was designed to embraces this instability.

The Light-Space-Modulator really embraces the fusion of art and technology as promoted by the Bauhaus school. This is a connection of unstable media with the avantgarde movement.

László Moholy-Nagy (1895-1946) was a Hungarian painter, photographer, filmmaker, graphic designer, and influential figure in the world of modern and avantgarde art. He is particularly known for his contributions to the Bauhaus school and his pioneering work in multiple artistic disciplines. The Light-Space-Modulator is considered a pioneering piece in the field of kinetic art and unstable media (The Art Story 2023).

His view on the autonomy of art and autonomous art institutions, can be seen on his teaching at the Bauhaus. *"When Walter Gropius invited him to teach at the Bauhaus, in Dessau, Germany, he took over the school's crucial preliminary course, and **gave it a more practical, experimental, and technological bent**. He later delved into various fields, from commercial design to theatre set design, and also made films and worked as a magazine art director."* (The Art Story 2023)

Also, on his view of how artists should address new technologies like the photo camera.

*"His interest in photography encouraged his belief that artists' understanding of vision had to specialize and modernize. Artists used to be dependent on the tools of perspective drawing, but with the advent of the camera **they had to learn to see again. They had to renounce the classical training of previous centuries**, which encouraged them to think about the history of art and to reproduce old formulas and experiment with vision, thus stretching human capacity to new tasks."* (The Art Story 2023)

He also believed that artist had the potential to challenge the status quo of modernity by embracing new technologies. *"Moholy-Nagy believed that humanity could only defeat the fracturing experience of modernity - only feel whole again - if it harnessed the potential of new technologies. Artists should transform into designers, and through specialization and experimentation find the means to answer humanity's needs."* (The Art Story 2023)

As we can see here, almost half a century before the V2 Unstable Media Manifesto, the seed of unstable media thinking was present on key figures of the (historic) avantgarde.

Computer art

The example of the Light-space modulator showed that computers are not a necessary mean for unstable media to take artistic incarnations. However, computers are a one of the main mediums in which unstable media takes an aesthetic side.

The digitalization of life

From the beginning of robotics and artificial beings, there has been the assumption that humans are at a higher level than those artificial beings.

Consequently, when an A.I., robotics, software, hardware, or computers in general make a breakthrough on human-like behaviour, the question of whether the machine has become human arises.

We saw such a situation when AlphaGo cracked the game of GO (Khos 2017), or when an A.I. produced a piece of art that was sold by an exorbitant price (Christie's 2018), and the consequent articles on what this mean for creativity e.g. (Hyde 2022). In addition to this we see that in literature and films most of them present the taking over machines as a doom scenario that would result in the enslavement, or destruction, of humans. These situations are based on the Anthropocene way of thinking (Most 2020). However, we could also drop the human centred perspective and take a flat ontology perspective where there is not a hierarchical relation where humans are on top of all the other entities in the ontology (Braidotti en Hlavajova 2018, 296).

In this perspective, asking whether the machine has become human is the wrong question. We should instead ask, how artificial or mechanical have humans become?

Media theorist Marshall McLuhan argues that technological development are extensions of our humanity (McLuhan and McLuhan 1988). For example, a car is an extension of mobility capabilities. Computers enhance our speed of calculation, the information we can retrieve and store. A major difference of the computer with other media is that it can transform any medium into any other medium (McLuhan and McLuhan 1988). This has given rise to a hypermediality in the way we perceive the world; McLuhan refers to this as the acoustic space; In his words:

"... with the rise of radio, television, the world wide web, and new media in general, a big flip took place in our time. This is the changeover from the eye to the ear. Most of us, having grown up in the visual world, are now suddenly confronted with the problems of living in an acoustic world which is, in effect, a world of simultaneous information. The visual world has very peculiar properties, and the acoustic world has quite different properties. The visual world which belongs to the old nineteenth century, and which had been around for quite a while, say from the sixteenth century anyway, has the properties of being continuous and connected and homogeneous, all parts more or less alike. Things stayed put. If you had a point of view, that stayed put.

The acoustic world, which is the electric world of simultaneity, has no continuity, no homogeneity, no connections, and no stasis. Everything is changing. To move from one of those worlds to the other is a very big shift. It's the same shift that Alice in Wonderland made when she went through the looking glass. She moved out of the visual world and into the acoustic world when she went through the looking glass". (McLuhan 1970)

On top of this, exponential development of microprocessors of the last the decades have forced a shift in our understanding and engaging with digital tools. Flusser argued that Romanian revolution was a mediated revolution (Flusser 1990). In that time, as Flusser pointed out, this made the event an extraordinary happening. However, the current development of the world like the Ukraine-Russia and Israel-Hamas conflict, illustrate that such events do not earn the status of happening anymore but are just event. Important here, is that depending on which side you are the media or technology will influence, and manipulate, our notions of morality and self, i.e. our superego and ego, which account for our perception of identity.

On a personal example, before smart phones if I would have to move from where I am to an unknown location B, I would use a map or ask for directions. I would remember telephone numbers and other such basic skills. Nowadays, I must find the way to an unknow location without google maps on my smartphone it will give me stress and I may lose my way. In my personal case, I can no longer function correctly in this society without several technological augmentations. My phone, computer, are not embedded in my organic body (yet) but have become unmissable for me.

Of Ghosts and Shells

Another point related to the raise of hypermediality to perceive the world is that the "world" does not necessarily mean the "physical world". Hypermediality has given rise to other "digital worlds" where we have an existence an identity on its own. In the well acclaimed film Ghost in the Shell (Oshii 1995), and the associated franchise, this duality is explored under the concepts of Ghost and Shell.

A Ghost can be compared to the western concept of the soul. The main difference is that the soul belongs to the spiritual world, whereas a Ghost belongs to the world of science.
A Shell is a physical object that can host a ghost. For example, it can be a human body, an animal body, a cybernetic body, or a machine.

At the beginning of the first film, a Ghost is understood as what defines humans. In other words, the difference between a human and a robot is that the former has a Ghost, whereas the latter does not.

During the films, this concept of Ghost evolves to not being only a defining characteristic of humans but of living beings in general. That means that other non-human beings would also

have a Ghost. Moreover, there can also be living beings that come into existence without a shell[8].

A Ghost is what defines sentient beings and live in general. A Ghost retains its "humanity," or living force, regardless of how much biological material is replaced by cybernetic parts. Since a Ghost is in the realm of science, it can be transferred from one shell to another. It can also be hacked to make it believe it is something other than it originally was.

We are all cyborgs…

In 1995 when the first Ghost in the Shell film was aired, these ideas were seen as Sci-Fi dissociated of physical reality. However, nowadays, my Facebook, Instagram, LinkedIn profile, digital data the government has collected, and many faces on the blockchain are essential to my identity beyond my physical body. Without them, I will be just a shell.

In this perspective, we could rephrase Dona Haraway on companion species (Haraway 2003), and argue that technology has become, to me, a companion species. I spend more time with my phone than with my dog and most of our interactions with other humans are mediated by technology.

The way we fuse with technology and several identities this facilitates, brings us back to the cyborg perspectives of Dona Haraway (Haraway, Cyborg Manifesto 2015). Following her definition of cyborg. I can say that I am a cyborg because I am a collection of individualities. I have my organic body, but I have a presence on Instagram, Facebook, DigiD, and several blockchains. They are genuine shells that I use to exhibit part of my Ghost(identity).

The digitalization of life does not stop on the individual. Nowadays, the international world order witnesses the raise of another type of power beyond the economic and military dominance. Namely, the digital as a dominant power in the international world order (Bremmer 2023). A good illustration of this are the USA elections of 2020, where technology companies did take an active role on the "democratically process". Important to notice here is that up to now, digital power structures are not managed by governments but by private corporations[9].

As humans, we are moving into a posthumanism, where the organically physical body is no longer the gravitational centre but our fusion as one being with technology in the sea of information.

All this illustrates how computers are changing our reality in a boarder sense. We will now focus on how computers require a different perspective on how we relate to creation of art objects.

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[8] The core of plot of the first film is that a Ghost with no Shell was born on the "sea of information". In the film it is called the Puppet Master or Project 2501. In the film, Project 2501 is a sentient being with enough consciousness to communicate with humans, seek political asylum, and aim for evolution to transcend its existence.
[9] The idea of corporations ruling the world has been present in the Cyberpunk literature since its beginning.

Computer art vs Traditional art – Practical differences

Paul Valery, quoted by Walter Benjamin in (Benjamin 1969), says: *"In all the arts there is a physical component which can no longer be considered or treated as it used to be, which cannot remain unaffected by our modern knowledge and power."*

This section we will discuss that physical component when computers are involved. In the later sections we will discuss differences on the perception of traditional aesthetic objects and digital aesthetic objects.

Computer art, also known as digital art, incorporates, algorithms, digital technology, and computers in the creative process.

Matt Pearson, one of the precursors of the Processing language, sees it as follows: *"This revolution would be impossible without a new understanding of software as cultural artifact. Where we once saw text processors as literal typewriter replacements, we now download and exchange apps as a popular pastime. Websites that used to be closed domains of proprietary information now sport public APIs, enabling professionals and enthusiasts alike to create ever popular "mashups" based on their data.*

In the creative field, the most significant development is the realization that software [and hardware] processes aren't simply tools, but can become the very material from which works are made… …A new generation of electronic artists has turned to code as fertile ground for conceptual and formal experimentation, simultaneously providing a pragmatic framework for computational creativity and a theoretical context for the created artwork." (Pearson 2011, x)

Three paradigm shifts

An additional point to Pearson's view is that already in the years 1960's artists were using computers for creative purposes. Several shifts of paradigm have been needed for this to happen.

From static to dynamic objects

A first paradigm shift is that when working with a computer artists must change the view of the art object from a static object dissociated from the artist and the viewer to a perspective where the art piece becomes a dynamic object that interacts with the artist and the viewer. Moreover, during the creative process technology allows for a "conversation" between the artist, the machine, and the work of art. This very much aligned in the view of the Unstable Media manifesto of the previous section, but also the creation process and the artwork itself become a cybernetic system where feedback loop is essential. We will discuss this more on detail in the next section.

All of this means that to make art with computer a different way of thinking was needed. As stated by Matt Pearson, *"With more traditional art forms—sculpture, painting, or film, for example—an artist uses tools to fashion materials into a finished work. This is clearly doing it*

the hard way. With generative art, the autonomous system does all the heavy lifting; the artist only provides the instructions to the system and the initial conditions. The artist's role in the production process may be closer to that of a curator than a creator. You create a system, model it, nurture it, and refine it, but ultimately your ownership of the work produced may be no more than a parent's pride in the work of their offspring." (Pearson 2011, 4)*.*

Technical craftsmanship in the praxis of artistic practice

This brings us to a second paradigm shift that relates more directly the avantgarde perspective. Namely, that the difference between the "digital artist" and the "software engineer" becomes very diffuse. This is very well aligned with the historical avantgarde movement of the Bauhaus that promoted the abolishment of differences between the artist and the artisan; in Walter Gropius words "The artist is an exalted artisan" (Gropius 1919). I would reformulate this by claiming that "the digital artist ought to be an exalted software engineer".

A first argument on why artistic practice with computers requires a fusion between art and craftsmanship is that technology is not usually developed or designed for artists purposes. We can argue that "art is mind over matter" (Mul 2018), because of this, using technology as an artistic medium requires the artist to have the craftsmanship to hack the machine to do something it was not intended to do.

A second point is that generic tools for general artistic purpose like Processing, p5.js, or TouchDesigner are programming languages. Therefore, working with those needs the "artist" to learn to program with them. For example, Processing and p5.js are dialects of Java and JavaScript respectively. Their syntax has been designed to be simple and accessible making it suitable for those with little or no programming experience. They abstract many of the complexities of underlaying programming language and well suited for task involving graphics and interaction. However, even with those, there is no way around writing the code.

One may think that the "artist" could hire a "software engineer" to make programing. The problem here is that without the knowledge of "programing" the artist would not be able to modify the program anymore. Hence the artist must become a skillful enough to express their vision in the system. An alternative to this is that that the artist become part of a team that can do it[10]. This is already a switch from the view of the traditional artistic practice that places the "artist" as an isolated individual.

This argument still works for less code intensive tools like Photoshop or Illustrator, the artist should be able to use the tool themselves of have enough knowledge of the process or tool to be part of a team that produce the "art objects".

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[10] In the software development industry, software is developed by teams. In fact, contemporary software development methodologies (Agile) foster the success and results as a team achievement over individual achievements.

The digital artist as an exalted software engineer also goes the other way around. That is technically skilled people interested in the use of technology for creative purposes ought to realize that technical considerations are not necessary the most important driver for the digital creative practice. Given that often the work will be a teamwork, communication and collaboration skills will be important for success. From my experience, I have met several technical skilled people with which I cannot collaborate for artistic purposes because they find difficult to compromise between technical correctness and collaboration over artistic purpose.

Timo Hoogland created a programing language, Mercury, to make music. He is actively promoting it is adoption to different audiences and describes the above point as follows: *"My workshops on Mercury are attended both by people coming from computer science backgrounds and music backgrounds. I have noticed that the ones coming from computer background are very quick to grasp the syntax and technicalities of Mercury but have difficulties making music with it. It is musicians the ones that can leave the technicalities asides and quickly start making music with it. Mercury was made to make music."* (Hoogland 2023)

Embracing remediation

A third change in paradigm is that working with computers by nature implies the mapping of information from one format to another.

The following example presented by Marije Baalman (Baalman 2022) illustrates this:

"A performer sits on stage, a cello in front of his body. With the bow he plays a few tones, and now he takes the bow off the strings and just moves the bow in the air, transforming the sound that was just played; almost invisible to the audience, he uses his feet on pedals that are taped to the stage floor. The performer controls the moves of the bow in particular and expressive ways, as he listens attentively to the resulting sounds. Occasionally, he reaches out with his left hand to a side table, where he moves some knobs or sliders, or presses a button. Alternating between playing sounds on the cello, moving the bow, and pressing the pedals, he builds up several layers of sound that together form a melodic and rhythmical structure. As an audience member it is fascinating to watch Andi Otto play his Fello. The type of music that Andi Otto produces is often performed from behind a table, with a performer staring at a laptop computer screen. But with the Fello, you can see how the music is created: what the source of the sound is, and how it is manipulated and modulated into electronic sound with a very organic feel to it. The worlds of the cello and of dub music meet as Andi is transforming the sound of the cello with the bow." (Baalman 2022, 19)

Marije Baalman points out the in piece above there is a mapping that is essential to interactive work. I add to this by saying that this mapping is essential to digital works. In terms of modern media theory, this can be rephrased by saying that remediation is inherent to working with computers. More on the conceptual implications of this in later sections.

In (Baalman 2022) Marije Baalman illustrates a general pattern for the mappings involved as follows:

- A gesture is performed in the environment.
- This is captured by a sensor that translates the gesture into an electronic signal.
- The signal is processed by an electronic circuit, often to digitize it.
- Next, the signal enters some sort of computational model that translates the data to parameters.
- These parameters control an output medium such as sound, light, video, or mechatronics.

"At each step in the process, there is a translation or a mapping problem: how is the output of one step connected to an input of another step? What happens inside each step? Of course, this is a simplification of the steps involved, and there many variations possible of this general scheme." (Baalman 2022, 25)

A simpler example, in the creative coding field, is when written code is compiled and then an image appears on the screen. Here we can send the "image" to a printer to make physical version of it. Here are three remediations. In the last one, we all have witnessed that this data transformation can often produce unexpected results that interfere the creative process or production. More complex, or less orchestrated, remediations like ones listed above require the digital artist full attention.

From my personal experience, in my work "Digital Presence" (2023) I aimed to capture visitors' heartbeat in one station and transmit to other station so that they could feel a physical sensation of the digital presence of others. Although conceptually simple, managing the remediation of the different data points and ensuring it keep working was far from trivial. After several testing and preparation, it failed in the final presentation.

This is to illustrate that in digital works even if you take care on how your data is being mapped and believe it is under control it may come back to haunt you.

Since in digital works the flow of data is, usually, continuous digital art requires the artist to embrace those changes.

[add example with Chagall]

Illustration Vera Molnar – from the imaginary machine to the real machine

Here I will illustrate the points of the previous section with the work of one of the pioneers of computer art Vera Molnar[11].

Vera Molnar is a Hungarian French artist known for her contributions to the field of digital art and algorithmic art. She was born on January 5, 1924, in Budapest, Hungary, and studied painting at the Budapest School of Fine Arts and then moved to Paris where she developed most of her practice.

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[11] Some may differ whether Vera Molnar is really one of the pioneers of computer art but since I do not want to not encourage the male dominated culture on art and its institutions, I will Illustrate the thinking behind computer art with her work.

Even of the social context in which she was educated, Vera Molnar wanted to be an abstract painter. In her own words, *"If I can describe myself, I am a painter, an image-maker of images of a non-figurative kind. I 'create' visual forms in the sense that they consist of combinations of shapes that cannot be found in nature"* (Molnar, Toward Aesthetic Guidelines for Paintings with the Aid of a Computer 1975)

She followed the constructivist tradition. She was not interested in grand concepts but rather on simple principles and rules that would reveal unexpected beauty. In her words: *"my life has been about squares, triangles, and lines. In this sense, I do not start from grand concepts that create patterns but rather from simple principles and rules and by introducing small variations undisclosed beauty appears"* (Riagamonti and Kennedy 2018).

This is well illustrated with one of the most recognizable works by Vera Molnar "Structure des Quadrilaters" (year?).

A first thing to notice is that "Structure des Quadrilaters" is a series of works that have had many variations during the years. The key point is that the core principle, or process, in all the instances of the series is the same (Molnar, Toward Aesthetic Guidelines for Paintings with the Aid of a Computer 1975, 188):

- Drawings start from an initial square array of like sets of concentric squares.
- By making variations on the variables a "conversation" of the Author and the computer takes place. In the case of this work, the available variables are:
    1. *The number of sets,*
    2. *the number of concentric squares within a set,*
    3. *the displacement of individual squares,*
    4. *the deformation of squares by changing angles and lengths of sides,*
    5. *the elimination of lines or entire figures and*
    6. *the replacement of straight lines by segments of circles, parabolas, hyperbolas, and sine curves.*

Thus, from an initial grid a great variety of different images can be obtained. In this description, we can see that "Structures des Quadrilaters" is not a fully static object but has a dynamic component which will results on different physical "aesthetic objects" that the artist could not foresee from the beginning.

In (MuDA 2019) she mentions how computer-generated randomness can be a replacement for intuition to make interesting art. This leaves even more room for undiscovered possibilities and adding to the dynamicity of her works.

[add some pictures and perhaps some code]

Something to point out here is that in the time of Vera Molnar graphic interfaces where not as well developed as they are now. Her early works where mostly done on plotter machines.

That is after she had written the code, she had to wait for the machine to reinterpret into a print on the paper. That is remediation is in the core of her practice.

"Structure des Quadrilaters", is an example of her process. She describes her creative process more generally as follows:

"Whenever I begin a picture, I have an initial idea of it in mind. The procedure that I use to arrive at the final work, to be described below, is tedious, if carried through by hand. Furthermore, the final picture rarely corresponds to my initial idea of it.

I develop a picture by means of a series of small probing steps and each step is followed by evaluation. In my opinion, painters should employ such a procedure, especially if they consciously wish to learn what kind of aesthetic importance is occurring on the canvas as the painting develops and what effect the work may have on viewers. Making a series of pictures that are alike except for the variation of one parameter is not uncommon" (Molnar, Toward Aesthetic Guidelines for Paintings with the Aid of a Computer 1975, 186)

Paraphrasing (Nierhoff 2018), a more detailed way to describe Vera Molnar process would be as follows:

She will set up a set of rules and will follow them and would modify the rules according to the results. Before she had access to computers, she would become and *"imaginary machine"* for which she would execute the rules and make the results.

However, as pointed out By Vera Molnar in (Molnar 1975) this stepwise procedure has two important disadvantages if carried out by hand. Above all, it is tedious and slow. To make the necessary comparisons in a developing series of pictures, one must make many similar ones of the same size and with the same technique and precision. Another disadvantage is that, since time is limited, one can consider only a few of many possible modifications. Furthermore, these choices are influenced by disparate factors such as personal whim, cultural and educational background, and ease of execution.

When she was able to get access to a computer 1968 (Nierhoff 2018, 6), her "imaginary machine" became a "real machine". She described this change as follows: *"the computer with its unmanageable potential of image variations is an optimal device. When it comes to digital images, the absence of their seclusiveness accommodates the artist's experimental scientific approach because, behind the single picture, there is always the image category that also needs to be considered. By means of random generators, chance can introduce interference into the program at various stages. As a consequence, new variations can be continuously calculated and realized as images. The selected images thus constitute only limited material expressions of a virtually infinite consecutive chain."* (Nierhoff 2018, 10)

Notice how in these citations Vera Molnar talks about a "conversation" between she and the machines. This is in line with the avantgarde thinking of Maholy-Nagy we discussed in previous sections.

On the view of software development in the praxis of artistic live, Vera Molnar thought that... *"…the computer, on its own, does not have the capacity to create art, however: it is a very good assistant, but it is a little bit stupid, a lot must be explained to it."* (Nierhoff 2018, 7). However she recognises that the computer was often more innovative than what she, or humans, could achieve *"Time and again, I have compared both forms of chance, one generated by me and the other resulting from mathematical probabilities, only to realize that my self-generated chance was much less innovative"* (Nierhoff 2018, 9).

She embraced the use of computers also to conceptualize her art practice: *"thanks to computers, the concept of form, in the broader sense, could be reduced to a lack of randomness with an organized set of elements"* (Molnar en Molnar 1989)

Aligning to the avantgarde principles, she also does not ignore the position of art in society. She rejects the autonomy of art *"I do not make drawings and paintings with the aid of a computer solely for personal satisfaction; I hope that others will also enjoy them. I do not agree with the notion of art for art's sake and of science for the sake of science. Sartre convincingly explains why this notion is untenable. I, personally, know of no artist who refuses to let people see his work. On the other hand, I do not believe that an artist should go to the extreme of ignoring his own taste and convictions in order to please others. There should be an intermediate ground where aesthetic satisfaction is experienced mutually."* (Molnar 1975, 189)

All this illustrates the three paradigms shift of working with computer art together with the relation to the avantgarde movements.

{relation to the avantgarde]

{close with reflection on my practice}

Digital art objects vs Traditional art objects – Conceptual differences

In the previous section we discussed the practicalities of artistic practice when computers are involved. We hinted at several points that such practicalities also implied some more conceptual differences at the way aesthetic objects are perceived when digital media is involved. In this section we will go deeper into those differences.

To illustrate the type of questions we will address, let's recall back the example of "Structure des Quadrilaters" by Vera Molnar. We mentioned that this work is a series of works which share an underlying common process for creation. From a traditional perspective we could say that the printed images in a series are the art object. However, this perspective ignores the underlying process and the relationship of the artist and the machine during the creation process. This raises several questions on the conceptual level of practice and the work itself:

- What is the relation of the artists, the work the machine and the process?
- What kind of artist mindset does this type of creative practice need?
- Which art theory can be used for this kind of creative practice?
- Although each series has aesthetic qualities are two different series different aesthetic objects?
- More generally speaking we could ask: what is the aesthetic object underlaying "Structure des Quadrilaters"?

The new "digital artist"

We begin by looking at the creative practice and the relation of the parties involved, i.e. artist, machine, process.

As mentioned in the previous section, randomness is at the core of Vera Molnar creative practice. In (MuDA 2019) she describes how she uses randomness in a systematic manner to broad her perspective and explore the possibilities of the aesthetic object that she is interested in. In (Molnar en Molnar 1989) she goes even further using randomness to provide a formal definition of form.

This approach of systematic study restriction of field of study and formal definitions is often used in science. At a first glance, it may seem that methodological approach would not be suitable for art practices. However, this is one of the changes digital media brings to the table. Claudia Gianneti expresses this as follows:

"While science, says Weibel, is distinctly methodological in character, art is generally not regarded as a method: «This is our first claim: art and science can only reasonably be compared if we accept that both are methods. This does not mean that we declare that both have the same methods. We only want to declare that both have a methodological approach, even if their methods are or can be different." (Gianneti 2004)

Peter Wiebel in (Peter 1998) elaborates more on how digital media bring since and art closer to each other. Jack Burnham places this change of paradigm in the context of scientific revolutions a follow:

"In a way this situation might be likened to the "morphological development" of a prime scientific concept-as described by Thomas Kuhn in The Structure of Scientific Revolutions (1962). Kuhn sees science at any given period dominated by a single "major paradigm"; that is, a scientific conception of the natural order so pervasive and intellectually powerful that it dominates all ensuing scientific discovery…

…the artist operates as a quasipolitical provocateur, though in no concrete sense is he an ideologist, or a moralist. "l'art pour l'art" and a century's resistance to the vulgarities of moral uplift have insured that…

…Scientists and technicians are not converted into "artists," rather the artist becomes a symptom of the schism between art and technics. Progressively the need to make ultrasensitive judgments as to the uses of technology and scientific information becomes "art" in the most literal sense." (Burnham 1968, 31)

This aligns at a higher level with the change of paradigm of "technical craftsmanship in the praxis of artistic practice" we mentioned in the previous section.

In summary the new "digital artist" requires technically craftmanship, methodological thinking, and collaboration skills. For the new digital artis the boundaries between science, art and technology ought to be diffuse and purposely disrespected.

Digital practice vs art theory

Unfortunately, Claudia Gianneti points out that this new way of working required by digital media and the way art theory has been developing are diverging instead of converging:

"…the profound transformations resulting from these new [technological] approaches did not invariably meet with understanding, let alone acceptance, from artists. If one further takes into consideration the recently re-ignited controversy about the long-predicted crises of art and philosophical aesthetics, as well the widespread discourse among postmodernist writers which was linked to tendencies in technological and academic theory, then everything does in fact seem to point toward a disintegration of art and aesthetics. Yet a large part of such polemics can be attributed to the fact that aesthetic theory and artistic practice have gone separate ways. Artists' increasing use of technology is bringing to light a far-reaching and on-going discrepancy between artistic perception, art theory, and aesthetics, which are seen to be notably diverging instead of developing synchronously and congruently." (Gianneti 2004)

This well illustrated on how the Rietveld Academy involves technology in the theoretical and practical education. For example, Studium Generale is one of the largest platforms the Rietveld Academy to address art theory. However, if look at the list of topics of the 15 editions (Rietveld, Studium Generale Rietveld Academie 2023)we have:

- 2023 — 2024 -- TECHNODIVERSITY — Beyond datafication and digital colonialism
- 2022 — 2023 -- REFUGE – fleeing, flowing, leaking

- 2021 — 2022 -- OCEANIC IMAGINARIES — How can we liquefy our ways of being? How can we think from and with the ocean?
- 2020 — 2021 -- RESILIENT BODIES — Strategies and Practices for Fluid Embodiments
- 2019 — 2020 -- RELATING (TO) COLOUR
- 2019 -- THE ART OF CRITIQUE — Image Power
- 2018 — 2019 -- TAKE A WALK ON THE WILD SIDE — Fabulating Alternative Imaginaries in Art and Life
- 2018 -- WITHIN AND AGAINST THE ACADEMY — Study, Rehearsal and Improvisation
- 2017 — 2018 -- HOLD ME NOW — Feel and Touch in an Unreal World
- 2016 — 2017 -- WHAT IS HAPPENING TO OUR BRAIN? — Art & Life in Times of Cognitive Automation
- 2015 — 2016 -- BOTS, BODIES, BEASTS — The art of being Humble
- 2014 — 2015 -- Are you alive or not? — Looking at ART through the lens of THEATRE
- 2013 — 2014 -- VOICE ~ Creature of Transition
- 2012 — 2013 -- WHERE ARE WE GOING, WALT WHITMAN? — An ecosophical roadmap for artists and other futurists
- 2011 — 2012 -- WE ARE THE TIME — Art Lives in the Age of Global Transition

Here we can see that in 15 editions in the last 10 years, only three have addressed technology in the title. Even in the one of this year on Technodiversity the topic is presented as follows:

"Our lives are subject to processes of datafication through which big tech companies and governments extract data from us for profit or social and political control. The material thus collected is fed into the algorithms and artificial intelligence trained to monitor human behaviour. In digital capitalism, or 'data colonialism' life is appropriated as a resource and managed and traded in the form of data. This not only perpetuates existing inequality and discrimination, but also leads to new injustices and power imbalances. How can we resist data colonialism and produce alternative technologies?

The concept of technodiversity can provide insights that cannot be reduced to capitalist extraction. Technodiversity recognizes that technologies are temporally and spatially produced by different knowledge systems, ideologies, political interests, economic forces and cultural practices. This liberating perspective can create space for collectives, peoples, and identities to produce and control their own data – no data, small data, indigenous data, more-than-human data, feminist data, queer data – and not be governed by Big Data and oppressive algorithms." (Rietveld 2023)

Even that the topic addresses technology, it addresses it on how technology plays a role in society but no mention on the creative practice based on technology. There is no explicit mention on how technology and artistic practice relate.

On the practical side, the university offers 23 workshops open to all students. Of those workshops, at most three focus on creative practice using digital media. Those are: X-Lab, CAD/CAM and computer workshop. Even of those, only the X-lab addresses unstable media as defined in the unstable media manifesto. The X-lab is the only workshop where there is

support for students using coding for their practice. The X-lab has one employee and is open three days per week 21 hour per week. The Rietveld academy has about 850 students.

The DogTime Program is not much different. In the 6 years of I have been involved at the institutions I have had two courses (Augmented Realities and UM Lab) that addressed and encouraged creative practice using technology. I have seen no course, at DogTime, or the Rietveld Academy that teaches the basics of programming either practical or conceptually. Even that one of the specialisations is called "Interaction design and unstable media" the graduation projects in the last 5 years of the department that address interaction or unstable media are more the exception that the norm.

As Claudia Gianneti said, there is a clear divergency of the theory and practice presented at the Rietveld Academy and creative practice using technology. In her words: *"This gulf between theoretical «corpus» and artistic practice culminates in a paradox that without doubt leads to the often proclaimed end of art."* (Gianneti 2004)

This means that the new "digital creative practice" requires its theoretical frameworks to embrace the technically craftmanship, methodological thinking, and collaboration skills. Interestingly, we can smell a similar situation that promoted the raise of the historical avantgarde movements where art institutionalization and practice were diverging.

The new "digital art object"

In the traditional aesthetic theory, there is an emphasis on art as manifestation of an "absolute idea" (Hegel), subjective judgement and disinterested pleasure (Kant). However, those are hard to align in a work like "Structure des Quadrilaters".

For example, the Hegelian perspective of art as manifestation of an "absolute idea" would not apply to any of the prints of the work as the process described is what is at the core of each print but none of the prints is the process itself. The subjective judgement a disinterested pleasure of Kant is also not directly applicable to the series or prints of "Structure des Quadrilaters". As Vera Molnar mentions in (MuDA 2019) she chooses the variations and prints that belong to a series depending on what is interesting to her at that moment.

Claudia Gianneti in (Gianneti, Cybernetic Aesthetics and Communication 2004) calls for a deviation of the Kantian and Hegelian inspired directly by cybernetics. Here information is the key concept to understanding aesthetic processes.

"Every work of art, in fact every artistic expression, (is) now viewed as a message transmitted by a creative individual (an artist or group of artists), known as the transmitter, to another individual (or group), known as the receiver, over a channel (systems of visual, auditory, and other modes of perception)" (Gianneti 2004)

From here she describes the approach of Information Aesthetics where four methods are considered for the aesthetic synthesis:

"The semiotic, the metric, the statistical, and the topological. The semiotic method is based on the examination of the sign; the metric method, as a sculptural principle, uses parameters such as width, length, number, or ratio in order to define a global structure, the micro-aesthetic, that takes material form as the gestalt or form of the work; the statistical method generates local structures, or a kind of micro-aesthetic; and the topological method, based on relational principles, is directed at variations of a certain gestalt." (Gianneti 2004)

The semiotic and metric method are well known from traditional aesthetic principles. But the statical and topological metho imply that aesthetic objects are not purely of physical nature.

"This concept is fundamental, since it interprets the aesthetic process as being one of information. It replaces earlier aesthetic interpretative methods with a technique of observation and communication. In other words, works of art are viewed as the mediators of information (aesthetic information): 'Works of art, it might also be said, are a special (that is to say established, not given) class of ‹carriers› of the ‹aesthetic information›'.

The concept of information should here not be understood to mean an unquantifiable message or communication, but an informational content measurable in the transmission and storage of messages. All information on whose transmission communication is based, is built up by means of ‹signs›." (Gianneti, Cybernetic Aesthetics and Communication 2004)

This can be aligned with the perspective of System Aesthetics:

"A "sculpture" that physically reacts to its environment is no longer to be regarded as an object. The range of outside factors affecting it, as well as its own radius of action, reach beyond the space it materially occupies. It thus merges with the environment in a relationship that is better understood as a "system" of interdependent processes. These processes evolve without the viewer's empathy. He becomes a witness. A system is not imagined, it is real." (Burnham 1968, 32)

Claudia Gianneti rounds this up by pointing out that:

"...aesthetic theory is no longer focussed exclusively on the art object itself, but on its process, on system and contexts, on the broad linkage of different disciplines, and on reformulating the roles of the maker and the viewer of a work of art." (Gianneti, Digital aesthetics: Introduction 2004)

Moreover, she claims that we should renounce to the romantic idea of viewers of art being "passive consumers" dissociated from the work of art itself. Jack Burnham also aligns on this *"Rather the object art has become a stage towards further rationalization of the aesthetic process in general."* (Burnham 1968, 32)
To this I add that if the viewer is not an active part of the piece of art it falls back in the traditional perspective of art.

I close this part by defining an aesthetic object as a physical or abstract object that is appreciated for its aesthetic qualities rather than for its utility or practical value. Aesthetic

qualities can include elements such as form, color, texture, harmony, balance, composition, emotional experiences, interactive and sensory experiences.

Relation to the avantgarde

In this chapter, we have illustrated how the new perception on the digital art object requires a rejection to the status quo. This and relation to the other avantgarde principles was already foreseen in the 1986 Unstable Media Manifesto by V2_ (V2_ 1986) where they do not only aim to define unstable media but also address how unstable media requires a new type of aesthetics that ruptures from the "traditional" aesthetic and audience of fine arts[12]. Here I have extracted the parts of the manifesto that most illustrate this divergence:

"WE DO NOT WANT TO BRING EXISTING ART TO THE PUBLIC, WE WANT NEW ART AND A NEW AUDIENCE…

…WE WANT TO PROPAGATE CONTINUOUS REVOLUTION IN A WORLD FULL OF SO-CALLED CERTAINTIES, AND WITH THESE CERTAINTIES, WE WANT TO BREAK.

IT IS THE ART TO PREVENT THE INSTITUTIONAL AND THE CERTAIN. QUANTUM THEORY AND RELATIVITY THEORY HAVE MADE IT CLEAR TO US THAT THE SENSIBLE REPRESENTATION OF OUR EXPERIENCE ONLY APPLIES TO A LIMITED AREA. AND THAT THIS DOES NOT BELONG TO AN UNDENIABLE STATEMENT OF SCIENCE IN ANY CASE…

…WE MUST SHAPE THE NEW, ASSUMING THAT NEW FORMS CAN ONLY ARISE FROM NEW CONTENT AND NOT VICE VERSA. CREATING NEW ART MEANS MAKING NEW CONTENT VISIBLE, TANGIBLE, AND AUDIBLE.

ART MUST BE FUNCTIONAL. WE SEE ART AS A FORMATIVE PRINCIPLE IN SOCIETY. ART MUST UTILIZE THE MATERIALS, MEDIA, AND POSSIBILITIES OF ITS TIME TO DETERMINE THE IDEAL FORM.

SCIENCE AND ART MUST BE A REVOLUTIONARY FORCE WITHIN SOCIETY AND NOT AN EMBELLISHMENT OF A MISERABLE EXISTENCE OR AN ECONOMIC FACTOR.

ART MUST BE DESTRUCTIVE AND CONSTRUCTIVE.

ART, SCIENCE, OR ANY MEDIUM IS NOT AN END IN ITSELF BUT A MEANS TO REALIZE A FORMING IDEA. IT SHOULD NOT FORM AUTONOMY WITHIN OUR SOCIAL ORDER BUT BE PART OF IT. NOT TO AFFIRM THE PREVAILING MORALITY AND POLITICS, BUT TO PROPAGATE CHANGE. ART SHOULD NOT TAKE PLACE IN THE AUTONOMOUS WORLD OF GALLERIES AND MUSEUMS BECAUSE THEY ACTIVELY OPPOSE CHANGE; THE ART TRADE BENEFITS FROM IT AND IS NOT INTERESTED IN CHANGES. THEY WANT THE END PRODUCT AND NOT THE JOURNEY. THEY ASSUME THE ABSENCE OF THE URGE TO OVERTHROW THE RESULT. THEIR

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[12] This in contrasts to the 1987 Unstable Media Manifesto by V2_ used in section (V2_ 1987) where we see a focus on defining what unstable media is and not its relation to art institutions or as a reaction to the status quo.

MOTIVES ARE PROVIDED BY THE SOCIAL CODE IN WHICH ART KNOWLEDGE HAS BECOME POWER AND THEREBY INFLUENCE AND PRESTIGE"

This and the illustrations in this chapter show how digital practice follows the avantgarde principles of rejection to art institutions, questioning the autonomy of art, and challenging of the status quo.

Illustration: Rafael Rozendal – The internet as canvas

Rafaël Rozendaal (1980-) is a Dutch-Brazilian artist considered one of the pioneers of internet art. We illustrate how Rafel Rozendaal's exploration of the internet as a canvas serves as a poignant illustration of the transformative shifts mentioned in the chapter.

In several of his talks, e.g. (Rozendaal 2014) and (Rozendal 2013), Rafael Rozendal emphasises that from internet is his canvas. This implies that his art works are embedded on the internet and as such are affected by the type of PC, screen size, colour settings, and the user.

"I just saw the Internet as a young child and then later in art school and I thought I can speak directly to my audience and that's absolutely amazing and so I decided not to treat the internet as a portfolio but as a place for art so I didn't want to make sculptures and put pictures online and I said no the browser is my canvas and I'm going to treat it with respect." (Rozendaal 2014)

Here we see how he embraces that the aesthetic object is no longer focussed exclusively on the art object itself, but on its process, on system and contexts.

For example, in his work https://www.intotime.us/ he wants to explore ways to divide the screen but since it is an internet based work, he needs to define a set of generic rules and then it is to the user to create the work by clicking on the screen. In other words, he reformulates the roles of the maker and the viewer of a work of art. Here his description of the work:

"…Here's another example just really simple rules you start with the screen we all know the screen and what's unique about the web is that each screen is different so you have to think about composition in a different way because painters are used to I'll make a black I'll make a square painting I'll make a portrait or landscape but on the internet you don't know so the screen might be someone could look at it on their phone and it's like this so this is how you start with some color and then you set a point and the screen is divided in four sections and you set another point and so you it's a dialogue between me and you because I'm making a set of rules and you can play within those rules so it's it's always been about the presence of the user and the influence of the user on the image and then the ground idea I'm very interested…" (Rozendaal 2014)

He points out that it is crucial for his work to be part of the praxis of our everyday internet experience. *"…we're used to being on the internet we see the work and we forget about the device but when we go to the exhibition space all of a sudden a computer is an object it's*

you're no longer in that dream area when you're at home and you forget about where you are.” (Rozendaal 2014)

In other words, he challenges the added value of art institutions for the artwork. His digital artworks, accessible to anyone with an internet connection, challenge the traditional notions of art consumption, distribution, and ownership. The internet becomes both the medium and the exhibition space, democratizing access to art in ways inconceivable within the confines of traditional art institutions.
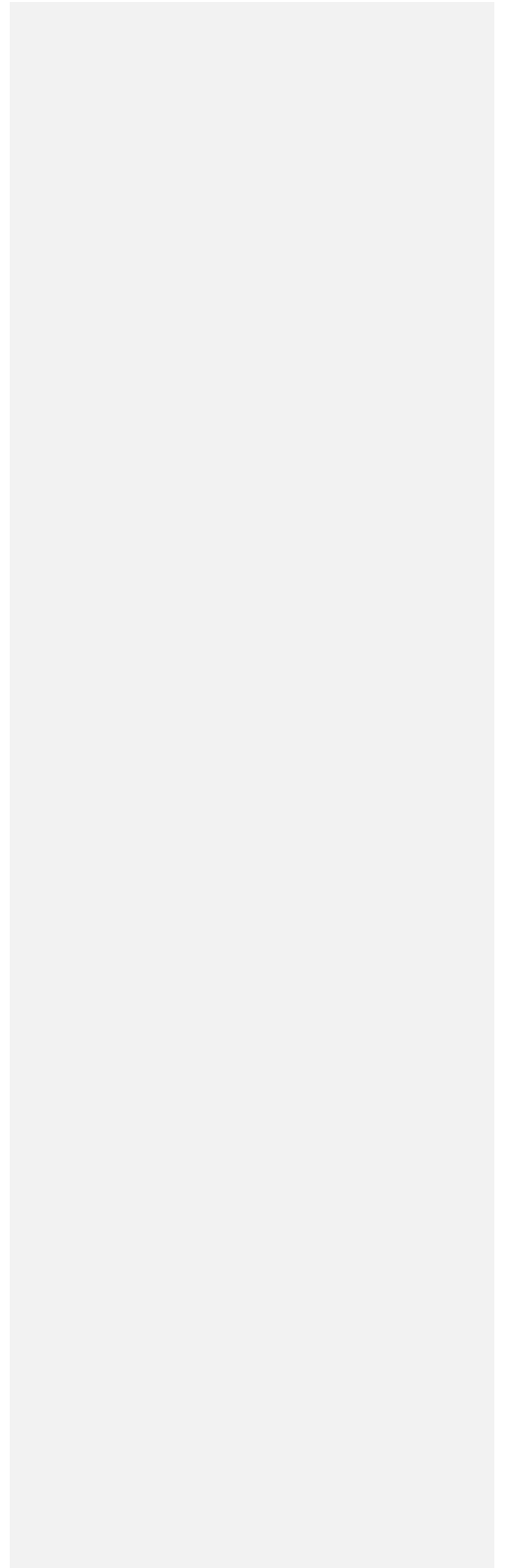
Originality in the digital age

One of the practical and conceptual challenges digital creative practice has brough into the picture is that of originality or reproducibility.

In the realm of digital art, replicability is not a flaw but a feature. Internet pioneer Steward Brand coined it under the slogan *"information wants be free"*.

From a pure practical perspective, this raises the following challenge:
"If our (digital) property can be infinitely reproduced, and instantaneously distributed across the planet "without" cost, how are we going to protect it? How are we going to get paid for the work we make with our minds, and if we can't get paid, what will assure the continued creation and distribution of such work?" (Tehranian 2021)

In realm of creativity this goes even deeper. A digital copy of a digital asset (art piece) is, objectively, the same as the original one. This goes against the art tradition of giving more value to the original because if the original is the same as the copy, what is the "artistic value" of the original piece.

Even more if new digital aesthetic is about flows of information, what does "information wants be free" imply for the digital practice.

Originality as a myth of traditional art

Already in 1935, Walter Benjamin (Benjamin 1969) was philosophising how machines would influence the creative practice.

He introduces the concept of the "aura" associated with unique, original artworks. The aura is the sense of authenticity, originality, and authority that is felt when in the presence of a one-of-a-kind piece of art. He then argues that mechanical reproduction diminishes the aura of an artwork. Copies lack the spatial and temporal context of the original, leading to a loss of the unique experience associated with the authentic work of art. In his words:

"Even the most perfect reproduction of a work of art is lacking in one element: its presence in time and space, its unique existence at the place where it happens to be" (Benjamin 1969, p3)

In other words, the historical context of an orginal piece can not be replaced by even the most perfect reproductions of it. Jack Burham, reacts to this perspective as follows:

"One hypothetical issue in esthetics is the seemingly trivial question of whether undetected art forgeries have historical validity. Usually the answer is that they do not, and the reasons most often invoked have to do with stylistic consistency or the utter uniqueness of the artist imitated. But regarded in the context of important records which have been destroyed and replaced with copies, the real reason becomes evident. We accept copies but feel no compulsion to venerate them. A known false work of art cannot mediate between past and

present, the diachrony of history and the synchrony of mythic event. Belief in the physical authenticity of the work of art is absolutely essential to myth, since the object is the tran-substantiated energy and psyche of the artist it survives. Hence totemism in art not only moves laterally in terms of linking contemporary art forms, but also vertically with relation to past and future events." (Burham 1973, p14)

Given that digital art raises from a different tradition than that of fine arts, the problem of replicability is more an issue of traditional arts that of digital art. It becomes a problem for digital art when it tries to force itself into the historical tradition of the art practice.

"Fundamental to the mythic form of art history is the practice whereby all objects are regarded as completely unique. Works of art may neither be divided nor multiplied, although they may relate to other works serially or cyclically." (Burham 1973, p40)

Since in digtial art reproducability is not fault but a feautre, any tradition that grows up from here ought to embrace this. The "aura" of a digital art work is not on its presence in time and space reltaive to traditional arts. At best, it would be for its position in the tradition of digital art.

From the web 1.0 to NFT's

In less than 30 years, the Internet and the World Wide Web, or the Web, have transformed the way we interact with media.

In its first iteration, the web 1.0 focused on messaging and static web pages. From this perspective, web 1.0 could be seen as "old" media on the side of books, news, and Television. One of the key characteristics of that "old" media is that there are few creators of information, and most users are information consumers. Because of this, the creators of information have a lot of control over the information that is made available and when it is made available to consumers.

This changed with the development of Web 2.0. Here it was/is all about reading, writing, and creating content by users themselves. Web 2.0 made the development of social platforms possible. These platforms got big because the content created came from all their users. In this sense, Web 2.0 was the birth of new media.

One of the crucial switches of web 2.0 relative to web 1.0 was that the end user is not only the user but also the participant of the information. In addition to this, the availability of information has moved towards an on-demand model.

These developments have led us to a situation where the web mediates most interactions. These include interactions with ourselves (e.g., agendas), others (e.g., messages), knowledge (e.g., Wikipedia), and information in general.

The work of Rafael Rozendaal we discussed above, takes place in web 2.0.

The next iteration of the web, web 3.0, is happening right now. It is based on blockchain technology. In addition to the reading and writing capabilities of web 2.0, it brings ownership and decentralization as digital natives in its conception.

Non-Fungible-Tokens

A key technical feature of web 3.0 was the introduction of Non-Fungible-Tokens (NFTs)[13]. NFTs were first promoted as the solution that would allow artists to be free from the middle parties dominating the art market. Artists would have full ownership of their digital assets.

This was ideal was well aligned with the avantgarde principles of rejecting of art institutionalization.
The process of creating, or making available, an NFT is known as "minting". This involves, uploading the digital asset, providing details about the work, setting any additional parameters (e.g., edition size), and defining the smart contract.

NFT's had a boom in 2021 and stormed into the art world. On the commercial aspect, some NFTs sold for over $69 million[14]. Even Sotheby's launched "Sotheby's Metaverse" branch to address the newcomers. However, as for today the hype has calmed down. The NFT markets have slowed down and the values of NFTs dropped. An in fact trade of NFT's is "regulated" by marketplaces like https://opensea.io/ or https://superrare.com/.

With the over saturation of the market, it is not possible for upcoming artist to be noticed without the help of networks and some middleman to promote their art. That is, we are back at the beginning where the art market is regulated by some autonomous institutions.

Notice that the process of "minting" requires the precise definition of the object to make available. The immutability of the blockchain implies that what is set there can never be changed again. That is minting promotes the creation of static finished art objects.

Although theoretically speaking any digital assets can be minted, i.e. become an NFT, what we see is that in the NFT's art markets images, gifs, and videos make most of the items available. In other words, in the NFT's art markets most of the items available are digital mimesis of physical counterparts. That is traditional aesthetic objects in digital form. They do not embrace the characteristics of digital aesthetic objects like dynamicity or cybernetic perspective as we discussed in the previous chapters.

Artist could mint other objects instead of the "final product", for example the script used to make the code, or the complete application needed for the digital artwork to run, but this

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[13] A non-fungible token (NFT) is a unique digital identifier that cannot be copied, substituted, or subdivided, that is recorded in a blockchain, and that is used to certify authenticity and ownership. The ownership of an NFT is recorded in the blockchain and can be transferred by the owner, allowing NFTs to be sold and traded. NFTs can be created by anybody and require few or no coding skills to create. NFTs typically contain references to digital files such as photos, videos, and audio. Because NFTs are uniquely identifiable assets, they differ from cryptocurrencies, which are fungible.

[14] This is remarkable to compare with famous artworks like the Sun Flowers of van Gogh, is valued at around $100 million.

does not happen. Mostly, due to the market demands. What I see, is that the NFT's audience is also just asking for digital representation of traditional physical art object. This brings us back to the 1986 Unstable Media Manifesto where we not only ask for a new art form but also for a new audience.

A question that remains unanswered for NFT's to integrate into the digital art practice is: *What is the right thing to mint?*

Notice that Rafael Rozendaal before NFT's offered the domain of his artworks for sale. Since the artwork is the website itself, and domains are unique, he had already solved the issue of originality and replicability for his artworks without NFTs.

Illustration, CryptoPunks and Bored Ape

Let's take a look at two examples of NFTs that draw a lot of attention. Those are CryptoPunks and Bored Ape Yacht Club.

The art objects.

"CryptoPunks are a set of 10,000 unique digital collectible characters stored on the Ethereum blockchain. Each item in the collection is a 24x24 pixel, 8-bit-style portrait with a unique set of attributes and traits.

CryptoPunks was one of the first non-fungible token projects and has since paved the way for other successful NFT collections such as CryptoKitties, Bored Ape Yacht Club and CrypToadz." (kraken.com 2022)

CryptoPunks were launched already in 2017, before the NFT boom of 2021 and where originally free. Seven CryptoPunks[15] are listed in the "Top 20 Most Expensive Sales of All the time" (Langston 2023)

"Bored Ape Yacht Club is a collection of 10,000 non-fungible tokens on the Ethereum blockchain. Each NFT in the collection depicts an Ape with an algorithmically generated set of traits, including different eyes, facial expressions, hair colors and accessories." (kraken.com 2022)

The Bored Ape where one of the most iconic collections in the 2021 NFT boom. These even came in the news and were topic of several lunch discussions. The reached their top on Bored Ape 8817 which sold for $3.4 millions dollars in auction facilitated by Sotheby's. The same action was the public launch of Sotheby's Metaverse branch. (GMTA Software Solutions Pvt Ltd 2023)

Review of the art objects.

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[15] Those are: #8857, #7804, #3100, #5577, #4156, #7523, and #5822

These two examples are illustrations of digital art objects that do not follow the full potential of digital art practice and in fact try to put digital assets back to the traditional establishment of art institutions.

To begin with, both collections restrict the number of items to 10.000 items whereas the possibilities are way much higher.

For example, CryptoPunks can have 7 attributes with each over 100 possibilities, which is a larger number than the current world population. Bored Ape is in the same order of magnitude.

That means that the collections have explored less than 0.00000001% of the space of possibilities. This is complete opposite to the principles we saw in the work of Vera Molnar. In fact, as only 10.000 were minted both CryptoPunks and Bored Ape have become an static object at the same level of a painting. That is, they go against the dynamic perception of digital aesthetic object.

Both use elements of randomness, but not in a way that we saw with Vera Molnar as an aid to the creative process to create a conversation between the artist, the machine and the viewer. It is more like the interaction the viewer has when buying a lottery ticket.

Also taking the Perspective of Claudia Gianneti on digital aesthetic objects as an exchange of information. That cannot be seen in any of the items of the collection, or the collection itself. The user, or viewer, has no influence on the art object. In that sense a CryptoPunk or Bored Ape is a static object dissociated from the viewer. In that sense it can only acquire "value" based on the tradition behind it. Just like a Rembrandt or a van Gogh.

In conclusion, CryptoPunks and Bored Ape are examples of that try to bring value to the digital art practice by cloning the traditional art establishments into the digital world.

Illustration: Life forms

Let's now look at another NFT example which is more aligned with the principles we have discussed in this thesis. It is Life forms.

Life forms can be found at https://lifeforms.supply. Here is the description there:

"Lifeforms are NFT-based entities. Like any living thing, lifeforms need regular care in order to thrive. If not properly looked after, lifeforms die.

A lifeform that has died will no longer appear in wallets, is not transferable, and cannot be brought back to life in any way. How do you care for a lifeform?

Within 90 days of receiving it, you must give it away."

These are dynamic objects that will keep changing until they die. Which in itself is an interesting concept as art objects are not usually perceived as living entities.

In addition to this, these artworks do make great use of the technology and embrace their possibilities. By imposing the condition that the artwork must be given away within 90 days, or it dies, really empower the possibilities of the blockchain and involve the viewers/owners into the artwork. The immutability capabilities of the blockchain and smart contracts make that this work was not possible before NFTs.

Summary

We discussed how the problem originality incarnates into digital objects. We concluded that the "problem" is not really a "problem" of digital art practice, but more a problem of traditional art institutions an establishment that romanticizes the notion of the singular, irreplicable masterpiece, elevating originality to mythical proportions. It becomes a problem for digital art when it tries to force itself into the historical tradition of the art practice.

Digtial art tradition ought to embrace reproducability. The "aura" of a digital art work is not on its presence in time and space reltaive to traditional arts. At best, it would be for its position in the tradition of digital art.

The promise of NFT's to save the art world by removing the middleman and empower artist to make a living is still to see its realization. In fact, after the NFT boom of 2021 the market is no longer as profitable and has either returned into traditional establishments and institutions or has become a niche for enthusiasts.

Finally, the way that most NFTs are produced and consumed today are mimics their physical counter parts and do not embrace their digitality and do not embrace the full potential of digital art and NFT's. The question to answer here is: *What is the right thing to mint?*

Conclusion: Towards a Digital Avantgarde

This thesis began with a personal exploration, seeking to harmonize my engagement with unstable media and interactive practices with the more conventional realm of "Expanded Painting" encountered at the Rietveld academy. Delving into avantgarde art theories and examining the aesthetics of digital art through a cybernetic lens set the stage for contextualizing the nuances that rendered my practice seemingly incongruent within the framework of "Expanded Painting."

In short, aesthetic theories rooted in cybernetic thinking embraced the dynamism, instability, and transformative potential of the digital art object, challenging the established norms of a historical art continuum where the art object is static, stable, and placed "above" the viewer.

In the pursuit of reconciling these divergent ideologies, it became evident that the core tenets of avantgarde movements, such as questioning artistic autonomy, rejecting institutional norms, challenging the status quo, and redefining art's role in everyday life, resonated strongly within the fabric of digital art practice.

The thesis also highlighted the pitfalls encountered by digital art when attempting to replicate traditional paradigms, emphasizing that these challenges arise precisely from the attempt to digitize physical art objects rather than embracing their inherent digital nature. Institutions like the Rietveld and DogTime, by resisting the assimilation of digital practices, perpetuate a divergence between art theory and digital art practice rather than fostering convergence.

Drawing inspiration from Carl Sagan's wisdom, the thesis reframes his words, suggesting that in a society reliant on science and technology, a lack of understanding in these domains is a perilous path that could herald the decline of art[16].

Yet, amid this divergence, there are beacons of convergence emerging within the Netherlands. Organizations like V2_, Creative Coding Utrecht, Acid Soldier Club, and the Waag embody the spirit of the Digital Avantgarde, actively bridging the gap between digital art practice and established art institutions.

In conclusion, the Digital Avantgarde emerges as the contemporary movement, seeking to establish the autonomy of digital art practice on its own terms, free from constant comparison to traditional counterparts. It echoes the sentiments of the V2_ 1986 Unstable Media Manifesto:

"WE DO NOT WANT TO BRING EXISTING ART TO THE PUBLIC,

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[16] The original quote is: *"We live in a society absolutely dependent on science and technology and yet have cleverly arranged things so that almost no one understands science and technology. That's a clear prescription for disaster."*

WE WANT NEW ART AND A NEW AUDIENCE."

The Digital Avantgarde, in its quest for innovation and independence, charts a new trajectory for the evolving landscape of artistic expression in the digital age.
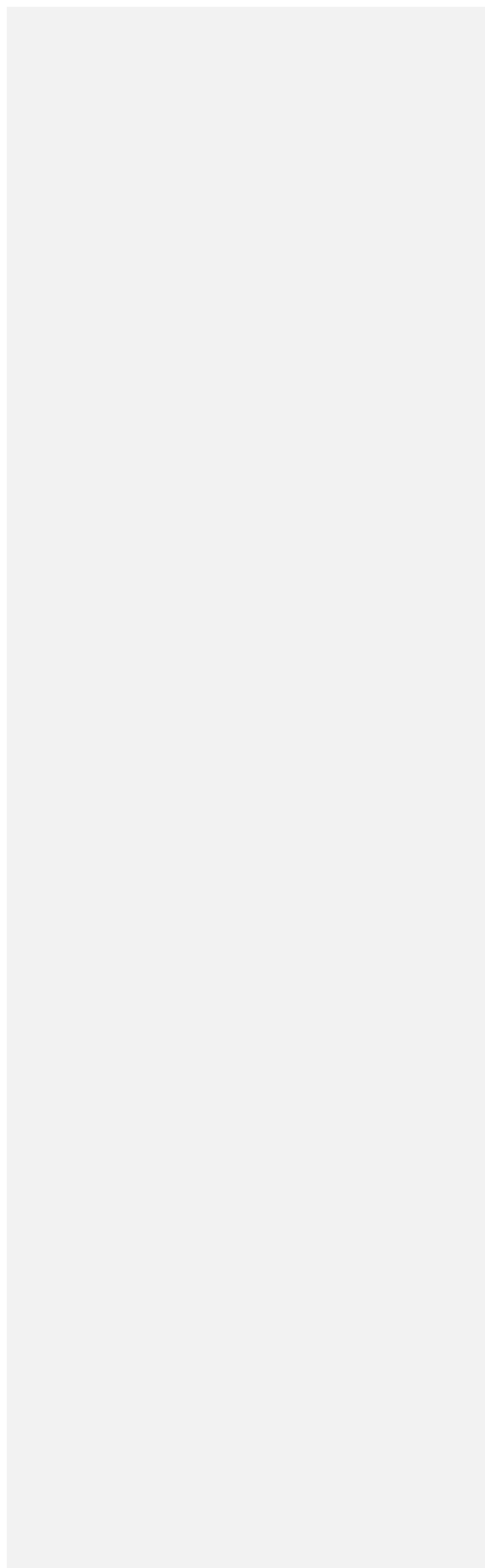
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