



DIGITAL AVANTGARDE

An inquiry on new
Digital Art Practices

Raul A. Leal R.

This thesis is part of the DOGtime bachelor program
Unstable Media & Interaction Design at the
Gerrit Rietveld Academy - Amsterdam - 2024
Supervisor: Willem van Weelden
Cover & Book Designed by Raul A. Leal



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Preface

New media, digital elements, and computer art are at the core of my artistic practice. These media are referred as Unstable media. 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, and embracing that instability makes them challenging yet interesting to me.

In an environment like DOGtime at the Rietveld Academy, unstable media is present on paper rather than in practice. In my year and years ahead, no more than a handful of persons embrace unstable

media in their artistic practice. Most of my classmates focus on painting, sculpture, installations, video, and mixed media. In the DOGtime terminology, this falls under the “Expanded Painting” umbrella. The use of digital media rarely goes beyond a video playing a loop.

Another recurrent element in practice is interactivity. In most of my works, the viewer must take an active role for the work to come to life. Interactivity is also seldom seen at the DOGtime program. Some people embrace it with performative elements, like workshops, during the creation process. However, even in these cases, I do not see how interactivity is at the core of the final artwork. In my perspective, most of the time, the viewer is dissociated from the work.

This has led me to use this thesis as an opportunity to reconcile the principles of Unstable Media, Interactivity and Computer art with the more traditional forms of “Expanded Painting” that I see at the Rietveld Academy.

During the lectures of Dyveke Rood, I encountered the theory of the Avantgarde movements. I hypothesise that Unstable Media art is a natural evolution of the Avantgarde into the digital age of information.

This thesis aims to set up a theoretical to encompass my creative practice. The theory of the Avantgarde and the views of V2_ will be the starting point. I will include theoretical concepts and pointers to artists and groups that use unstable media and interactivity in creative practice.

INTRODUCTION

Introduction

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 challenges emerging from digital art practices facing established art practices and institutions.

We unravel this dissonance through the lens of lessons learned from Avantgarde movements. As we navigate this exploration, it will become apparent that the principles once championed by avantgarde pioneers are actual and alive for establishing a digital art practice against the established institutional frameworks that aim to house

and legitimise artistic endeavours.

This thesis has as its departure point the exploration of how the Avantgarde 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. These radical artistic endeavours, born out of a genuine desire to break away from tradition, questioned the essence of art's autonomy, art institutions, and the role of art in the praxis of life. These elements will come back when we discuss the establishment of a contemporary digital art practice.

Central to our inquiry is the concept of the autonomy of art, a principle cherished by avantgarde visionaries juxtaposed against the institutionalisation of art. More explicitly, there is a tension between the inherent freedom of artistic expression and the institutional structures that seek to categorise, validate, and often stifle innovation. Such tension gave fruitful soil to the historical avantgarde movements to develop. The clash between the avantgarde spirit and institutional

expectations sets the stage for examining digital art's place in the contemporary art world.

To demonstrate this, we structure this thesis as follows:

In Chapter 1 (Historical Contexts), we elaborate on the historical context that will play a role in this thesis.

Section 1.1 (Avantgarde movements) addresses the *Historical Avantgarde* movements of the beginning of the 20th century and the subsequent *neo-Avantgarde* that emerged at the end of 1940 and onwards. We will follow the “*Theory of the Avantgarde*” by Peter Burger (Burger, 1984) and “*Historische Avantgarde*” by Ferdinand Drijkoningen et al. (Drijkoningen et al. 1991) to underpin the understanding of the theory of Avantgarde used in this thesis. This theoretical framework will set the stage for an in-depth exploration of the clash between contemporary digital art and established art institutions.

In Section 1.1.1 (The core avantgarde subjects), we draw inspiration from the rebellious spirit of avantgarde movements by revisiting their views concerning the autonomy of art, art institutionalisation, the societal role of art to challenge the status quo, and how art should integrate into the everyday life. As we unravel these interconnected threads, it will become evident that avantgarde art challenges institutional norms and societal expectations, inviting us to rethink the role of art in our daily lives. Those challenges will come back in Chapter 2 (Computer art) and Chapter 3 (Originality in the digital age) when we look at digital art in the contemporary world.

In Section 1.2 (Unstable Media), we venture further into contemporary art. We beckon our attention to the transformative impact of digital technologies on artistic expression. “*Unstable Media*” encapsulates the dynamic and ever-evolving nature of artistic practices influenced by digital tools and platforms. We follow the 1987 Unstable Media Manifesto (V2_, 1987) to make the concept of Unstable media more precise.

Section 1.2.1 (Illustration, Light-Space-Modulator) presents a first bridge between avantgarde ideals and Unstable Media by discussing the *Light-Space-Modulator* (1930) by Laszlo Moholy-Nagy.

Chapter 2 (Computer art) is the core of this thesis. Here, we present illustrations and case studies to unravel the intricacies of unstable media and computer art compared to traditional forms. For example, we discuss the switch from “*static*” art objects of traditional art to “*dynamic*” art objects of computer art. This chapter lays the groundwork for understanding the nuanced relationship between contemporary digital art practices, the institutional frameworks that seek to encapsulate them, and the paradigm shifts accompanying the digitalisation of artistic creation.

The chapter begins with Section 2.1 (The digitalisation of life) with an inquiry into the digitalisation of life itself. One reason is that 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 draw inspiration from the film “*Ghosts in the Shell*” (Oshii, 1995) 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 relationship between artist and medium blur into a collaborative dance.

We continue with Section 2.2 (Computer art vs Traditional art – Practical differences), where we scrutinise the differences between creating art objects with computer art and using traditional means.

In Section 2.2.1 (Three paradigm shifts), we contextualise the paradigm shifts brought about by unstable media. Each of those challenges established norms and invites a redefinition of artistic processes

and outcomes.

In Section 2.2.2 (Illustration Vera Molnar – from the imaginary machine to the real machine), we show how those paradigms come to life within the work of Vera Molnar. She is 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 computer-generated art.

We traverse to Section 2.3 (Digital art objects vs Traditional art objects – Conceptual differences), where we discuss the distinctions between digital art objects and their traditional counterparts more in-depth.

In Section 2.3.1 (The new digital “art”), we scrutinise the conceptual disparities, shedding light on how digital technologies have reshaped the materials and methods of artistic creation and the essence of

what constitutes an art object.

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 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 analyse the conceptual underpinnings of this shift, exploring how digital art objects challenge the viewer’s traditional expectations of permanence, singularity, and originality.

This exploration reflects the relationship between digital art practices and avantgarde movements, as presented in Section 1.1. While avantgarde artists sought to break free from traditional constraints,

contemporary digital artists face similar challenges while navigating a frontier where the boundaries between virtual worlds and the physical world blur, opening up new avenues for experimentation, innovation, and a redefinition of artistic autonomy.

Section 2.3.2 (Illustration: Rafael Rozendaal – The internet as canvas) presents Rafael Rozendaal's exploration of the internet as a canvas. His work is a poignant illustration of the transformative shifts mentioned in Sections 2.2 and 2.3. 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.

We have one final chapter, Chapter 3 (Originality in the digital age), 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.

Section 3.1 (Originality as a myth of traditional art) discusses how traditional art often romanticises the notion of the singular, irreplicable masterpiece, elevating originality to mythical proportions. However, in the digital age, where copies are exact and infinitely reproducible, the very foundation of this myth is questioned.

In Section 3.2 (From the web 1.0 to NFT's), we introduce the new development of NFTs (Non-Fungible Tokens), which promise to be the solution for digital artists to break free from the chains of traditional art practice and institutions. However, in Section 3.3 (Illustration, CryptoPunks and Bored Ape), we point out how the commercial dimensions of digital art, delving into the rise of NFTs, are bringing digital art back into the traditional frameworks it aimed to disrupt. Section 3.4 (Illustration: Life forms) presents the example of Life forms, a blockchain-based artwork that embraces the avantgarde principles

we have discussed.

In Chapter 4 (Conclusion: Towards a Digital Avantgarde), we close the thesis with some personal final remarks on my practice and my take on the Digital Avantgarde.

I

Historical Contexts

1. Historical Contexts

In this chapter, we follow the historical context that will play a role in this thesis. Here, we aim to use this historical context to clarify what we mean by Avantgarde and Unstable Media.

1.1 Avantgarde Movements

In this section, I will provide (historical) context to the Avantgarde view on aesthetics, art objects and art practice in general.

The first thing to understand about the Avantgarde is that it does not refer to one artistic movement. The Avantgarde encompasses a group of artistic movements considered innovative for their time.

For this reason, neither this section nor this thesis aims to provide an exhaustive description or definition that will fit all Avantgarde movements.

This section aims to clarify the concepts we take from the theory of the Avantgarde used in this thesis. For this purpose, we will follow “Theory of the Avantgarde” by Peter Burger (Burger, 1984) and “Historische Avantgarde” by Ferdinand Drijkoningen et al. (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991) as primary sources.

To illustrate why we need to make the concept of Avantgarde more specific, let's look at the Wikipedia entry on the Avantgarde.

“In the arts and literature, the term avantgarde (advance guard and vanguard) identifies 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 minds as a general idea. However, this is not our primary definition because it has

at least two challenges for our argumentation. In the first place, the definition needs to be narrower. Any artistic expression outside the mainstream falls under the avantgarde umbrella if we follow that. This would imply that any art object using innovative media would fall under the Avantgarde; as we will later see, in Section 3.3, this is not the case. In the second place, we are looking for a definition that clarifies the ideals and motivations of the avantgarde movements.

Chronological speaking, (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991), in its introduction, situates the first wave of Avantgarde movements from the beginning of the 20th, before World War II, until the mid-1930s. This wave, called the “*Historical Avantgarde*,” encompasses artistic movements like Dada, Surrealism, Futurism, and Constructivism.

New Avantgarde impulses emerged at the end of the 1940s and the beginning of the 1950s, giving rise to a second wave called the “*neo-Avantgarde*”. Some of the movements in this new wave include

Pop Art, Conceptual Art, Kinetic Art, Feminist Art, Minimalism and Fluxus.

As mentioned before, avantgarde is not one single movement. Because of that, principles vary significantly between movements and periods. Some movements, such as Dada and Surrealism, may embrace absurdity and irrationality, while others, like constructivism, prioritise structure and interdisciplinarity. Nevertheless, the following overarching themes of avantgarde art will be relevant for this thesis:

- *Reaction to the autonomy of art (Burger, 1984).*
- *Rejection of art institutionalisation (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991),*
- *Challenging the status quo in art and society (Burger, 1984) and (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991).*
- *The role of art in everyday life (Burger, 1984).*
- *Commitment to innovation and experimentation (Wikipedia, 2014-2023).*

There are more principles related to Avantgarde art. For example, radicalism, interdisciplinarity, social and political engagement, rejection of tradition, and democratisation of art, but we will not discuss those here in detail.

1.1.1 The Core Avantgarde Subjects

I will now proceed to describe and discuss 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. In Chapter 2, we will discuss how those apply to computer art.

1.1.1.1 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 to serve a specific function or purpose in society. This is often called “*l’art pour l’art*” or “*art for art’s sake*”.

According to (Burger, 1984), in 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 is then seen as a realm where individuals can freely explore their creativity and emotions. Peter Burger points out that the rise of the individual independent artist coincides with the appearance of the private art collector. As a follow-up, the autonomy of art also played a role in the development of cultural capital. Art, especially in fine arts and high culture, became a marker of social status and education among the bourgeois class.

Peter Burger points out that 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 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.

1.1.1.2. Art Institutionalisation

The developments on the autonomy of art also promoted the “autonomous art institution”. Ferdinand Drijkoningen quotes Bourdieu as follows:

“...the process of art’s autonomization correlates with the emergence of a distinct societal category of art producers. These producers are increasingly inclined to recognise 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 proselytising 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 labour 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 a relatively independent intellectual and artistic field. It is also related to the development of a new definition of artists and their art” (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991, p. 16).

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. An institution is defined as “*an organised system of goal-directed activities*” (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991, p. 15). Therefore, by an “*autonomous art institution*”, we mean “*an organised system of goal-directed activities for art*”, where the institution itself defines art.

For example, a guild of painters 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 objectives.

Section 1.1.1.3, we will discuss the “Salon des Beaux-Arts” case as an example of an “independent art institution”. In that section, we will also present how the Salon played a role in the developments that led Marcel Duchamp to make the work “*Fountain*”.

A more modern example of an autonomous art institution 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)

Rejecting these “*autonomous art institutions*” is a core element of all avantgarde movements (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991, p. 23).

In the case of the historical avantgarde movements, (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991, pp. 23-26) describes the following four patterns of reaction to art institutions:

1. **Total Rejection:** The first and most radical view is rejecting any form of institutionalisation. *Dadaists* rejected the traditional art world and organised anti-art exhibitions and performances in defiance of established art institutions. Their work was often characterised by absurdity and anti-establishment sentiment. For example, Marcel Duchamp’s “*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

significant 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 Section 1.1.1.3.

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. 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’s “*La Trahison des Images*” depicts a pipe with the text “this is not a pipe”. Here, we can see a challenge to the establishment of paintings that are only images. The work’s use of text and self-reference opens alternative perspectives to appreciate a painting.



La Trahison des Images (1929) - Rene Magritte

3. **New order:** A third view engages in a radical battle with the existing institution of art and aims for a “new order,” a complete upheaval in the social order. These movements speak of the “integration of art and social life” and the “aestheticization of life”. *The Italian Futurists* aimed to break 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 in its educational program. The influence of the Bauhaus is still seen today in several areas of design, art and architecture (DW Documentary, 2019).

In the neo-Avantgarde movements, we also see other reactions to institutions. Here is a non-exhaustive, non-chronological, broad overview of neo-Avantgarde reactions to autonomous art institutions.:.

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- 5. Creating Alternative Spaces:** Some avantgarde movements created 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 organised events, such as “psychogeographic” explorations of cities, outside the confines of traditional art institutions.
- 6. Anti-Commercial Stance:** Many avantgarde movements resisted the commercialisation 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. *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 broader audience. Often, street

artists want to remain 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 cultural and political movement *Black Arts Movement* aimed to make art more inclusive and relevant to the African American community. It fought 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 the institutional framework, challenging the idea of art as a permanent, collectable object. *Land Art (Earth Art)* artists make works that do not fit an art institution's traditional premises. For example,



"De Groene Kathedraal" (1996) - Marinus Boezem's

Marinus Boezem's "*De Groene Kathedraal*" (1996) consists of trees planted in such a way that they replicate the cathedral of Reims. Such large-scale, site-specific works are not meant to be collected or displayed in traditional art institutions but are integrated with the natural environment.

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, 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 the *Appropriation Art* movement 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 recontextualised existing art, gender constructs, the concept of originality and commercial imagery of the moment—a clear challenge to the discourse led by art institutions.

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

The eleven above points are neither chronological nor complete,

but rather give a broad overview of the reactions to art institutionalisation of different Avantgarde movements.

1.1.1.3. Art and the status quo of society

In the previous two sections, we followed (Burger, 1984) and (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991) and their argument that one of the intrinsic motivations of the historical avantgarde movements was a reaction to the rise of the bourgeois society and the autonomy of art and autonomous art institutions. We also suggested that several other neo-avantgarde movements reacted similarly to art's autonomy and its institutions. This brings us to a third common characteristic of avantgarde movements: the challenge of the status quo.

“*Fountain*” by Marcel Duchamp is one of the most iconic Dadaist works of the historical avantgarde movements. We will use it to illustrate how avantgarde movements challenge the status quo.

We will now recall some of the steps that led to “*Fountain*” and the concept of non-art. We should return to nineteenth-century Paris and the “*Salon des Beux-Arts*” for this.

The “*Salon des Beux-Arts*” defined art essentially as tableaus, and anything that would not fit this will not be accepted to be exposed in the Salon (De Duve, 2014). This and the historical tradition meant that the Salon was the central French institution that defined art at their time. In other words, for something to be considered art, it had to be exposed at the Salon. However, “*Masked Ball at the Opera*” by Édouard Manet was refused by the Salon in 1873 but nowadays is considered “art”.

Such institutionalisation meant that the careers of several artists depended on the decisions of the Salon jury because being exposed at the Salon was a synonym for “good art”. This induced several protests of refused artists and attempted alternatives, but they had little effect. In 1863, Napoleon III granted the refused artist an alternative



Poster Salon Société nationale des beaux-arts Paris (1891) - Lemercier



Masked Ball at the Opera (1873) - Edouard Manet

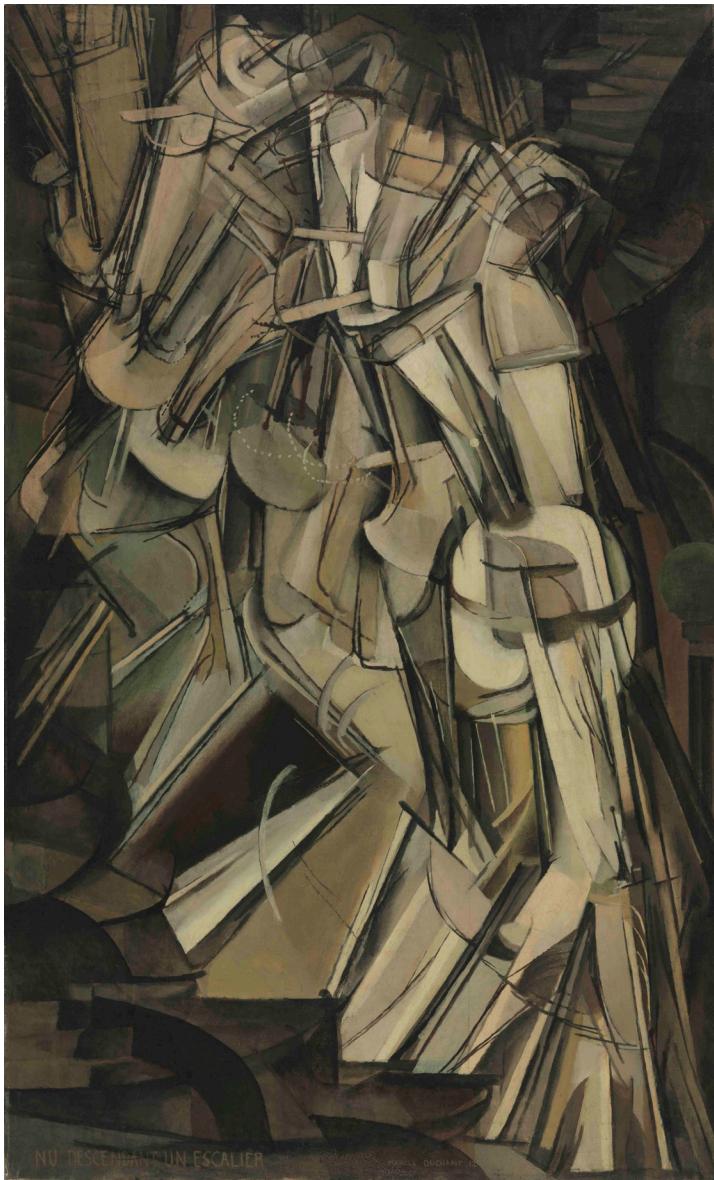
exhibition space, the “*Salon des Refusés*”. But even with the emperor’s blessing, this had the opposite effect than expected:

*“It is a mistake, then, to read the *Salon des Refusés* as an “alternative” exhibition and as the glorious revenge of the Avantgarde 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. But,

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

However, even with the no-jury rule, Marcel Duchamp’s “*Nude Descending a Staircase (No. 2)*” was expelled from the 1912 *Salon des Indépendants*. Hence, as mentioned above, it qualifies as non-art.



Nude Descending a Staircase, No. 2 (1912)- Marcel Duchamp



Fountain (Replica 1964 -Original 1917) - Marcel Duchamp

The rejection was “presumably for not being a cubist tableau worthy of the name” (De Duve, 2014)

After such events, Marcel Duchamp moved to New York, where he witnessed the creation of the New York Society of Independent Artists in 1917, where he was part of the board. Again, this society planned an exhibition in the Grand Central Palace of New York, with no-jury rule.

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

“Objections, on both aesthetic 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. It still generated discussions that are followed even nowadays. “*Fountain*” challenged the status quo of the time on several layers. (De Duve, 2014) presents the following layers:

- When a urinal is art, anything can be art.
- Anyone can be an artist.
- “Independent art institutions” create a monopoly 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 the *Appropriation Art* movement, which involved appropriating/copying other artists' work. We will look more into this in the last chapter from 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.

In the first place, Sturtevant challenges the prevailing belief of her time, which emphasised technique as the paramount aspect of art. She contends that neither the visual concept nor the execution holds the primary value; instead, the artist's intention lies at the core

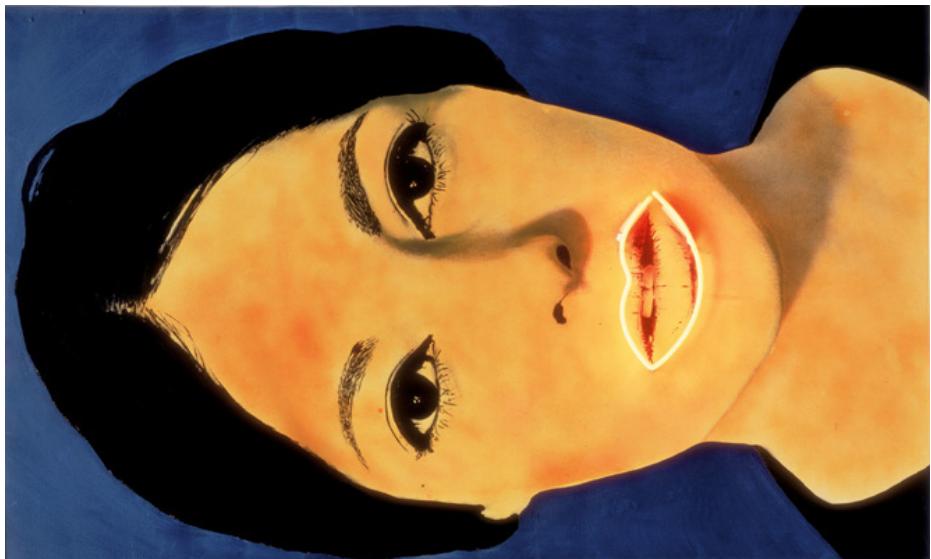
of the artwork. Consequently, deliberately reproducing an artwork can still result in a piece of significant artistic value worthy of inclusion in institutions like the Stedelijk Museum in Amsterdam.

In the second place, she challenged the gender bias of her time. At her time, all works in museums and galleries were by male artists. Moreover, by copying several other works by male artists, she illustrated that there was a gender bias, and it was not only the technique or concept of the art piece.

The Stedelijk Museum proved her right by showing her version of the work and Martial Raysse's version side by side 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.

PEINTURE A HAUTE-TENSION (1965) - Martial Raysse



D'après Martial Raysse, « PEINTURE A HAUTE-TENSION » (1968) - Elaine Sturtevant

As a final remark common to both Marcel Duchamp and Elaine Sturtevant, Siri Hustvedt (Hustvedt, 2019) presents evidence that suggests “*Fountain*” was first created by Baroness Elsa von Freytag-Loringhoven but due to patriarchal structures, we have not heard of her or recognize her contribution.

1.1.1.4. Art and everyday life

The cases of Elaine Sturtevant and Marcel 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 we will use during this thesis—namely, the position of art in everyday life.

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

We will illustrate this with the ideals of the Bauhaus educational

program. There are two reasons for this choice. The first reason is that the Bauhaus ideals for art education align well with the three avant-garde principles we discussed before. A second reason is that the Bauhaus promoted a return of artists to craftsmanship. This will come back in Section 2.2 when we look at computer art.

The educational program of the Bauhaus advocated for integrating all art practices and everyday life. For example, Johannes Itten, one of the famous lecturers of the Bauhaus, promoted the motto “*Play becomes party - party becomes work - work becomes play*” in his lectures. But he was not the only one:

“The same link between work and play was in Gropius’s mind when he wrote the Bauhaus Manifesto: ‘Theatre, lectures, poetry, music, costume balls. Creation of festive ceremonies in these gatherings.’ And indeed, the everyday life of the Weimar ‘Bauhäusler’ was punctuated by many such events. Gropius introduced Bauhaus evenings of literary readings ... with the intention of bringing together the local population and the youth of the Bauhaus.” (Magdalena, 2023, p. 79)

This is even more explicit and strongly formulated in the Bauhaus manifesto:

“The art schools of old were incapable of producing this unity—and

how could they, for art may not be taught. They must return to the workshop. This world of mere drawing and painting of draughtsmen and applied artists must at long last become a world that builds. When a young person who senses within himself a love for creative endeavour begins his career, as in the past, by learning a trade, the unproductive “artist” will no longer be condemned to the imperfect practice of art because his skill is now preserved in craftsmanship, where he may achieve excellence.

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. Merciful heaven, in rare moments of illumination beyond man’s will, may allow art to blossom from the work of his hand, but the foundations of proficiency are indispensable to every artist. This is the original source of creative design.” (Gropius, 1919)

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

<picture>

As shown in the DW documentary on the Bauhaus (DW

Documentary, 2019), the integration of art into everyday life was also seen in the Bauhaus teaching method that replaced the traditional pupil-teacher relationship with the idea of a community of artists working and living together. The Bauhaus aimed to bring artists/students back into contact with everyday life. Therefore, architecture, performing arts, design, fashion and even parties were given as much weight as fine arts.

1.1.2 Section Roundup

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 more engaged, politically aware, and socially relevant art. This perspective played a crucial role in shaping the direction of avantgarde art in the 20th century and beyond. The impact of these ideas is still felt nowadays. This is summarised with the following subjects:

- *Reaction to the autonomy of art.*
- *Rejection of art institutionalisation.*
- *Challenging the status quo in art and society.*
- *The role of art in everyday life.*

Chapter 2 will discuss how these principles relate to the contemporary digital art practice. This will lead us to a proposal for a Digital Avantgarde.

1.1 Unstable Media

In the introduction, we are immersed in a digital age where technology and information mediate many interactions. Artistic practice has not been immune to this. Around 1984, there was a pivotal point where artistic practice moved from a primarily analog to a predominantly digital practice (Moller Hansen, 2023). The digital practice involves using computers and? more generally, using so-called unstable media.

This chapter will briefly summarise and define what I mean by unstable media and related terms.

Broadly speaking, “Unstable Media Art” describes a category of contemporary art that incorporates technology and digital media as integral components of artwork. The Unstable Media Manifesto (V2_, 1987) defines unstable media as...

“...all media which makes 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 practised misuse of these media...”

The manifesto then 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..."

1.1.1 Illustration, Light-Space-Modulator

At first glance, it may seem that unstable media is related to computers and digital media. However, this is not 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, red, 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 light-bulbs 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.

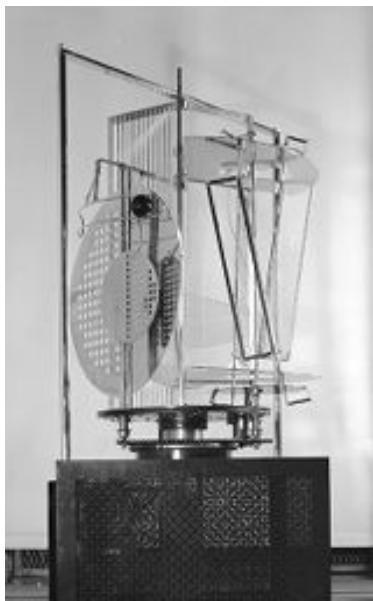
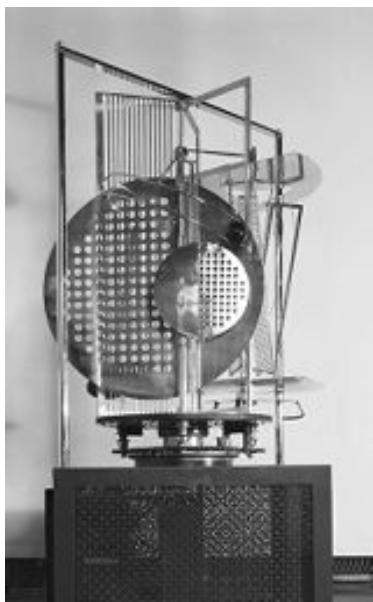
The first sector's playful movement study: three rods move jerkily (since the plan of the edges and base are somewhat different) on an unbroken path. Different materials, translucent screening, parallel horizontal rods, and wire netting are mounted to the three rods.

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, 1930)

An important point to notice here is that the Light-Space-Modulator artwork is not only the sculptural (physical) object but



Light-Space-Modulator (1930) - László Moholy-Nagy

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 the space where the piece is located. Since space and light on it are unstable, the Light-Space-Modulator was intentionally designed to embrace this instability. This example shows that computers are not the only medium that can be used for Unstable Media art. There are other possibilities, like bio-art or participative art but we will not address those here as it is a topic on its own.

The author László Moholy-Nagy (1895-1946) was a Hungarian painter, photographer, filmmaker, graphic designer, and influential figure in modern and avantgarde art. He is mainly 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 kinetic art and unstable media (The Art Story, 2023).

His view on the autonomy of art and autonomous art institutions can be seen in his Bauhaus teaching.

“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, he believed that 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 artists 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).

He encouraged students to embrace new technological developments in their art practice. The Light-Space-Modulator embraces the fusion of art and technology as promoted by the educational ideals of László Moholy-Nagy and the Bauhaus school.

As we can see, almost half a century before the V2 Unstable Media Manifesto, the seed of unstable media thinking was present in key figures of the (historic) avantgarde. There are several essential points to notice here. In the first place, notice that the art object produced by the Light-Space-Modulator is not only the machine itself but the whole context in which it is placed and activated. The aesthetic object behind the Light-Space-Modulator is not static but dynamic. This includes its interactivity with space, time, and viewers. Such a change of perspective will be essential for our look at computer art and the avantgarde in the following chapters.

II

Computer Art

2. Computer art

Section 1.2 defined Unstable media as

“...all media which makes use of electronic waves and frequencies, such as engines, sound, light, video, computers, and sound.” (V2_, 1987).

However, computers have become the primary tool for interacting with sound, light, and video. But more generally, thanks to sensors and the Internet of Things (IoT), they are often used to interact with electronic waves, frequencies and much more. In other words, nowadays, computers are used to interact with all the media we define as Unstable Media. This makes them an essential medium in which unstable media takes an aesthetic side.

Computer art is relatively new. The CODA Museum in Apeldoorn

just had an exhibition, “*Behind the Screens - 50 years of digital art*” (2023), which put digital art practice as a child compared to the centuries, or millennials, of traditional art practices.

It is not uncommon for me to be in a social gathering unrelated to the art academy. When I say I go to the art academy, people assume this means I do some traditional art such as painting, drawing or sculpture. Even though we are bombarded with digital (aesthetic) images daily, the average person on the street does not place them as art. Another example is the spelling correction of this thesis. The word “*artwork*” comes often in the text, it is not uncommon for the spelling correctors to suggest using a word like “*painting*” to replace it. As we will see in Section 2.3.1.2, digital art practice is still finding its place even at an art institution such as the Rietveld Academy.

In this chapter, we will go back to the core avantgarde subjects we presented in Section 1.1.1 and present how they are relevant to establishing a digital art practice.

I will focus on how computer art practices align with my practice. That is computer-based creative practices that use computers, programming, sensors and interactivity. I call those the *Digital Avantgarde*. For those, I will address and illustrate how:

- *They also show a reaction to the autonomy of art,*
- *reject traditional art institutionalisation,*
- *challenge the status quo in art and society,*
- *and address the role of (digital) art in everyday life.*

I do not intend to develop a Digital Avantgarde theory that fits all the possible uses of computers in art.

2.1 The digitalisation of life

From the beginning of robotics and artificial beings, robots have been seen as servants to humans. We can trace this idea back to Greek mythology to the myth of Talos. The myth is briefly summarised as follows.

King Minos asked the gods for help to protect the island of Crete. For this purpose, the God Hephaestus created a giant bronze automaton (Talos) powered by Ichor, the life fluid of the god. The ichor was stored in a compartment on its heel and closed by a bolt. Even of its robotic behaviour, Talos was a sentient. He is aware of his existence but not of his mechanical nature. He was human enough to aim for a long life. When the Argonauts, during their quest for the golden fleece, came to the island, Talos spotted them and tried to destroy them. However, they tricked Talos with the promise of immortality and then managed to remove the bolt on its heel. The Ichor then spilt out, and then Talos ceased to function; see (Mayor, 2019) for a version of the myth.

In the myth of Talos, we see that even though Talos was aware enough to aim for immortality, he was a mechanical being and then his fate was to serve others.

The gods created Talos, but in modern literature, humans are still at a higher level than artificial beings. For example, in the book “*I, Robot*” (Asimov, 2019) by Isaac Asimov postulates the first law of robotics as follows:

“A robot shall not harm a human, or by inaction allow a human to come to harm.”

In the book, Isaac Asimov explores several situations where the first law of robotics is essential for humans to keep control over robots.

In his futuristic universes, robots have become so advanced and superior to humans that the only thing that prevents them from taking control is the first law of robotics embedded in the core of their positronic brains. For the law to apply, robots ought to show servitude to humans.

In addition to this, we see that in literature and films, when machines take over leads to the enslavement, or destruction, of humans. See, for example, the Matrix series, the Terminator series, or Space Odyssey. I know of no film or literature where machines being higher than humans is presented as a good scenario.

These fictional perspectives are reflected in everyday life. When an A.I., robotics, software, hardware, or computers make a breakthrough in 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 for an exorbitant price (Christie's, 2018), and the

consequent articles on what this means for creativity, e.g. (Hyde, 2022).

In these perspectives, humans are on top, and everything in the ecosystem is there to serve them. 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 no hierarchical relation where humans are on top of all the other entities in the ontology (Braidotti & Hlavajova, 2018, p. 296). If we drop the human-centred approach, asking whether the machine has become human is the wrong question. Instead, We should examine how machines change how we perceive the world and experiences. We should instead ask how artificial or mechanical humans have become.

For example, in the era before smartphones, navigating from point A to an unfamiliar point B would involve using a map or asking for directions, requiring basic skills like remembering telephone numbers. Nowadays, attempting to find my way to an unknown location

without Google Maps on my smartphone induces stress, and there's a risk of getting lost. In my case, various technological augmentations, such as my phone and computer, have become indispensable. While not physically embedded in my organic body (yet), they have become integral for me to function effectively in contemporary society. My smartphone has become an extension of myself.

The idea of technology as technological development as extensions of our humanity was presented by media theorist Marshall McLuhan (McLuhan & McLuhan, 1988). For example, a car is an extension of mobility capabilities. Computers enhance our calculation speed and the information we can retrieve and store.

A significant difference between the computer and other media is that it can transform any medium into any other medium (McLuhan & 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)

The exponential development of microprocessors in the last few decades has significantly shifted our understanding and interaction with digital tools. Flusser argued that the Romanian revolution, occurring during his time, was a mediated revolution (Flusser, 1990), making it an extraordinary event. However, contemporary events like the Ukraine-Russia and Israel-Hamas conflicts illustrate that what were once considered extraordinary happenings have become commonplace.

Notably, depending on one's physical side of the conflict, media and technology will influence and manipulate our notions of morality and self, our superego and ego, shaping our perception of identity.

2.1.1 Of Ghosts and Shells

Another crucial aspect tied to the rise of hypermediality in shaping our perception of the world is that the term “world” is no longer confined solely to the “*physical world*.” We now have alternative “*digital worlds*” where individuals can establish a distinct existence and identity. We draw inspiration from the well-acclaimed film “*Ghost in the Shell*” (Oshii, 1995) and the associated franchise to explore this.

The core of the plot of the first film is as follows:

“*Ghost in the Shell*” is set in a futuristic cyberpunk world, where mechanical augmentation is not the exception but the norm. The story revolves around Major Motoko Kusanagi, a cyborg policewoman, and her partner, Batou, also a cyborg. They are part of Section 9, a special operations unit tasked with apprehending a mysterious hacker, the Puppet Master, or Project 2501.

As they delve into their investigation, Major Kusanagi questions her existence and humanity as she grapples with the nature of consciousness and the merging of human minds with machines. The film explores themes of identity, consciousness, and the impact of advanced technology on the human experience.

The film explores the mind-body duality 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.

A Ghost is what defines sentient beings and life 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.

The film’s core plot can be rephrased as “a Ghost with no Shell was born on the *sea of information*”. Even though the Puppet Master was created as a program to hack information, it has gained consciousness and become a sentient being. It has enough consciousness to communicate with humans, seek political asylum, and aim for evolution to transcend its existence.

2.1.2 We are all cyborgs...

In 1995, when the first Ghost in the Shell film was aired, these ideas were seen as Sci-Fi dissociated from physical reality. However, nowadays, my Facebook, Instagram, and LinkedIn profiles, digital data the government has collected, and many faces on the blockchain are essential to my identity beyond my physical body. Moreover, society does expect us to have such digital identities; without them, we will be just shells.

In this perspective, we could rephrase Donna Haraway's discussion 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 my interactions with other humans are mediated by technology.

The way we fuse with technology and the several identities this engenders brings us back to the cyborg perspectives of Donna Haraway (Haraway, 2015). Following her definition of a 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. I use several shells to exhibit part of my Ghost(identity).

The digitalisation of life does not stop at the individual. It also influences the world order. Until the end of the 20th century and the beginning of this century, international powers were determined by military or economic factors. For example, the Roman Empire had the most organised army of the time and hence was a dominant power. During the Cold War, the USA and the USSR were dominant because of their military capabilities. Nowadays, the EU has a lot of influential power because it is the largest consumer market. However, (Bremmer, 2023) argues that the international world order is witnessing the rise of another type of power beyond economic and military. Namely, digital has become a factor that influences the international world order. A good illustration of this is the US election 2020, where technology companies took an active role in “saving the democratic process”. Important to notice here is that up until now, digital power structures

have not been managed by governments but by private corporations.

As humans, we are moving into 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 broader sense. We will now focus on how computers require a different perspective when creating art objects.

2.2 Digital Art vs Traditional Art Practical Differences

Before the upcoming of computers, art objects had a very clear physical component. A painting has a frame; you can see the paint's textures and the artist's brush strokes, etc. Even during the creation process, this physicality is very present. For example, a painter can make decisions based on the physicality of the paint or the canvas to

use. Even works like “*Fountain*” or the “*Light-Space-Modulator*” have a physical object that occupies space. However, with computers, much of the physicality is hidden from the artists and viewers.

In this section, we present some of the practical differences that artists should embrace during the creation process when computers are involved. In Section 2.3.2, we will even argue that there is no need for the art object to leave the computer. The computer is the canvas itself. In digital art, there is no need for a physical object.

Matt Pearson, one of the pioneers of creative coding using Processing, sees it as follows:

“This revolution would be impossible without a new understanding of software as a 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 realisation 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, p. x)

2.2.1 Three Paradigm Shifts

This section presents three paradigm shifts that we believe are relevant to this thesis. Those are:

- *Embrace of remediation,*
- *Conversation with the machine,*
- *Technical craftsmanship in the praxis of art practice.*

We chose these because they align well with the core avantgarde subjects presented in Section 1.1.1. In Section 2.2.2, we show how those paradigms come to life within the work of Vera Molnar. She is an artist who navigated the transition from physical art objects to the ethereal possibilities of digital creation.

2.2.1.1 Embracing Remediation

Making digital art implies the use of a computer. A computer is usually a (black) box with a processor and some peripherals for input

and output. Standard peripherals for input are a mouse, a keyboard and an electronic pen. Standard peripherals for output are a screen, sound speakers, and a printer.

There is no way for us humans to interact with a computer without those external hardware devices. Using computers for creative purposes implies no direct interaction with the material used; those external hardware devices mediate our interaction. This differs from traditional art practice, where the artists can directly interact with the material. We all have experienced how a bad light or screen can affect how we thought a drawing was. Another example is when we send a digital image to a printer to make a physical version of it. We all have witnessed that this data transformation can often produce unexpected results that interfere with the creative process or production.

Using computers implies that a medium, the input device, is transformed into another medium, the output device. In media theory, this process is referred to as remediation. Paraphrasing (Bolter & Richard,

2000), we can define remediation as follows:

“Remediation refers to the process by which one form of media incorporates or represents another form of media. In other words, it involves the representation of one medium in another.”

In the case of computers, remediation goes even further than the use of peripherals.

Modern programs like Photoshop, Fresco, and Sketch offer the digital painting or drawing experience. In Fresco, when you use paint, you can even see textures. If you use watercolour, you can see the colours blend; you can use (digital) water to control it as you would with watercolour paint. You can even buy some tips for the electronic pen or covers for the tablet to have a more “natural” feeling.

All of these are remediations of physical media. Digital watercolours are not physical watercolours, no matter how good the simulation is. Moreover, depending on the version of software used, or the screen, the same file may produce different objects. For example, Olia Liliana’s artwork *“My Boyfriend Came Back From the War”* (1996) is an

interactive website. At the time of its creation, internet connections were not that fast. It was expected to wait for an image to load, and the resolution was very low. This was an essential part of the artwork lost when the internet became faster and image resolution improved. In other words, the changes in the media used made it a completely different artwork. For the 20th anniversary, emulation was used to simulate the hardware and experience of the time.

That is, in digital art practice, artists should consider not only the media is unstable, but changes in hardware and software will change the work. But remediation in digital art practice goes even further.

Another common situation when using a computer is to use code. However, unless the script is straightforward, it is not immediate to deduce from the code how the computer will behave. As we will see in Sections 2.2.1.2 and 2.2.1.3, this requires a conversation between the artist and the machine, which is a remediation of the script into the desired output medium.

As the final case of remediation, let's consider the case of an interactivity installation. Here is a scenario that we will use to clarify it.

"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, p. 19)

Marije Baalman points out that in the piece above, a mapping is essential to interactive work. In (Baalman, 2022) she presents 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.*

- An electronic circuit often processes the signal to digitise it.
- Next, the signal enters some computational model that translates the data into 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 are many variations possible of this general scheme.” (Baalman, 2022, p. 25)

In each mapping step, one medium incorporates another medium into itself. The sensor incorporates the gesture into an electronic signal, which in itself is incorporated into digital form by the processor, etc. That is, there is a remediation in each of the mapping steps.

Maria Baalman claims that such mapping is essential to interactive digital installations. Following our argumentation, this translates into saying that remediation is essential to all digital interactive works.

From my personal experience, in my work “Digital Presence” (2023), I aimed to capture visitors’ heartbeat in one station and transmit

it to other stations 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 kept working was far from trivial. After several tests and preparation, it failed in the final presentation.

Up to this point, we've outlined four levels of remediation in digital art practice. The last example illustrates that even meticulous mapping and a sense of control over data may not be foolproof. That means that in digital art, artists must fully embrace and navigate these various levels of remediation.

2.2.1.2. Conversation with the machine

One of the features computers have introduced to our lives is the “*undo*” feature. All the mainstream programs have an undo function. Even *Fresco*, with its emulations of watercolour, has an undo action. This means that when digitally drawing with watercolours, one can wet the “paper”, apply colour and let it blend. If the output

is unsatisfactory, press undo to recall the previous state. This is not possible with traditional watercolours. Once the paper is wet and the tint has started to blend, there is no going back; this is a point of no return. The artist must either embrace the output or begin again. In physical art practice, such points of no return are prevalent. This is not the case with digital art practice.

This second paradigm is that technology facilitates a “conversation” involving the artist, the machine, and the evolving artwork within the creative process. The dynamic component in the creation becomes more pronounced with technology.

Under this paradigm, the creative process becomes a cybernetic system where a feedback loop becomes an integral aspect of the creation piece. That is, technology introduces a dynamic component into the creation process. In Section 2.3.1.3, we will delve into this in more detail. There, we argue that this dynamic aspect is not only during the creation process but also an essential part of the artwork.

PENDULUM

Many nights, he, the maker, came to me to look at my naked body with the illusion that I would help him to get rid of her image in his mind. I was then young, my body pure white with no marks from anyone.

Each night, he, the maker, would gently touch me with his fingers, trying to understand how to turn me on. First, he was shy, very modest touches that would make me exhale some simple black and white shapes. I was always happy to help him and let him decide how to use me to release his mind.

With time, he became more confident. He was more experimental. He made do things for which I had to cry with an error message in reply. My body still has the marks of those nights, my first marks, symbols that something deeper was behind those nights.

From there, her shape slowly started to appear. Her long body, her round face. At first, she would just be there with her mesmerizing swing from left to right. He wanted to master her. He wanted to control every property and variable of her existence, but she remained wild for a while.

Still, he used me for his plan. He made me grab her. Sometimes I expanded her face, other times I shrank it. I changed the shape of her body; I hanged her upside down. I did whatever he wanted me to do her. He used me to master her.

One night, he took her without mercy. She tried to escape

but he grabbed her and isolated her in a single class. There, he was in total control of her length, shape, swing, life and existence. This left a deep mark on me. Not visible to the naked eye but still there. I was the one to master her confinement in the class.

Under his guidance, I learned to take control over her. At first, I used to call her just once. I would transform her body in ways that would please him. I would drive her into positions that I would not have imagined. Just to see the many faces of her swing, left right, left right. I learned to master her for him.

Once I had control over one single instance of her existence, I started to go further. I called her not once but twice, then four times, eight times, then sixteen times in an infinite arithmetical growth that would please him. For his pleasure I finally instantiated her a hundred times; all perfectly aligned and dancing left to right.

She then became the work to be admired as a piece of art. He also moved on to pursue someone else. I was pushed into a dusty folder forgotten in the sands of time. I was left here alone with only the marks on my body to remind me of them both.

Short story by Raul A. Leal R.

On practical matters, a different way of thinking is needed to make art with computers. This conversation is very explicit in the case of generative art. Matt Pearson describes it as follows,

“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, p. 4).

Even though not all digital art is generative, we have a similar situation in any form that uses code; programming is the act of giving instructions to the computer.

As suggested at the beginning of this section, this is still the case with even more friendly tools like Fresco, Photoshop, or Illustrator. The artist decides the tools and parameters that should be used. Then, the program does the heavy lifting to create one version of the visuals. It presents one proposal to the artist. Then, the artist decides whether to proceed or not. This decision is not irreversible, as they can always

return to a previous state.

In Section 2.2.2, we will illustrate this conversation with the work of Vera Molnar.

2.2.1.3. Technical craftsmanship in the praxis of artistic practice

The third paradigm shift we want to discuss relates more directly to the avantgarde perspective. Namely, the difference between the “digital artist” and the “software engineer” becomes very diffuse.

This aligns well with the core avantgarde subjects we presented in Section 1.1.1. As we mentioned, the educational ideals of the Bauhaus promoted the abolishment of differences between the artist and the artisan; in Walter Gropius’s 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*”. Here, we present three arguments for this.

A first argument for why artistic practice with computers requires a fusion between art and craftsmanship is that technology is not usually developed or designed for artistic purposes. We can argue that “*art is mind over matter*” (Mul, Creative Strategies, 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.

An artist collective like JODI is an example of technical skills used for creative purposes. Their artwork <https://wwwwwwwww.jodi.org/> is characterised by embracing dysfunctionality for artistic purposes. This requires a technical understanding of how websites work to be able to bend the rules.

The second point is that tools for general artistic purposes like Processing, p5.js, or TouchDesigner are programming languages. Therefore, working with those requires 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 underlying programming language and are well suited for graphics and interaction tasks. However, even with those, there is no way around writing the code.

One third argument is that avoiding the technicalities puts the artist in a passive position during the creative process. One may think that the “artist” could hire a “software engineer” or technically skilled person to make programming or solve all the technicalities. The problem is that without the “*technical knowledge*”, the artist can no longer modify the art object once it is delivered. Hence, the artist must become skilful enough to express their vision in the system. An alternative to this is that the artist becomes part of a team that can do it. This last point is also a switch from the view of the traditional artistic practice that places the “artist” as an isolated individual.

These arguments still work for less code-intensive tools like Photoshop or Illustrator. The artist should be able to use the tool themselves and have enough knowledge of the process or tool to be part of a team producing the “art objects”.

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

Timo Hoogland created a programming language, Mercury, to make music. He is actively promoting its adoption to different

audiences and describes the above point as follows:

“My workshops on Mercury are attended both by people from computer science backgrounds and music backgrounds. I have noticed that those from a computer background are very quick to grasp the syntax and technicalities of Mercury but have difficulties making music with it. It is musicians who can leave the technicalities aside and quickly start making music with it. Mercury was made to make music.” (Hoogland, 2023)

2.2.2 Illustration: Vera Molnar From the Imaginary Machine to the Real Machine

Here, I will illustrate the paradigm shifts of the previous section with the work of one of the pioneers of computer art Vera Molnar. As we will see, she is an artist who navigated the transition from imaginary to tangible machines. She fuses the ethereal possibilities of digital creation with the materiality of the real machine.

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. Then, she moved to Paris, where she

developed most of her practice. Vera Molnar passed away on December 23, 2023 at the age of 99 years.

Despite 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 in simple principles and rules that would reveal unexpected beauty. She said:

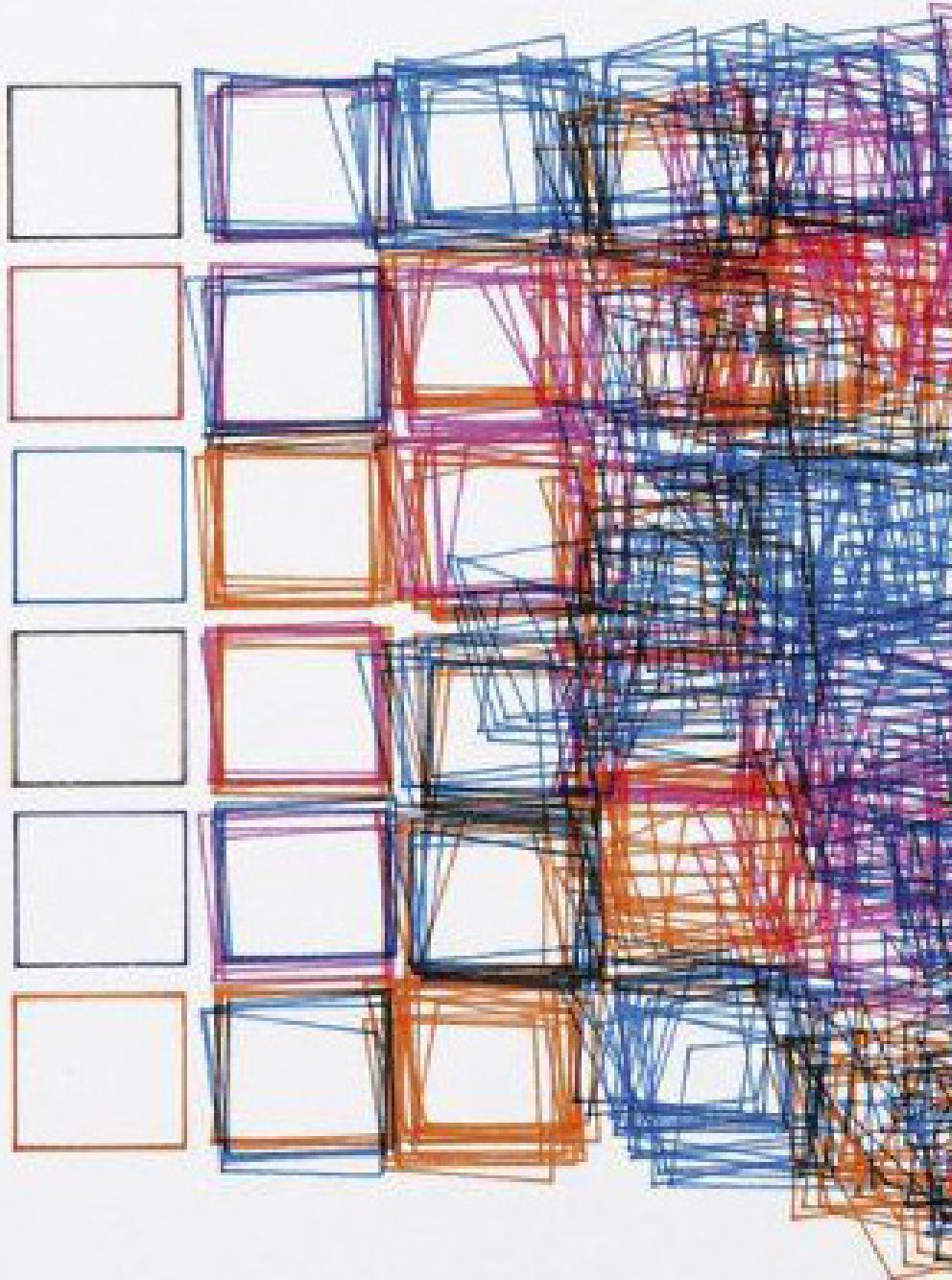
“My life has been about squares, triangles, and lines. In this sense, I do not start from grand concepts that create patterns but rather from simple principles and rules and by introducing small variations undiscovered beauty appears” (Riagamonti & Kennedy, 2018).

This is well illustrated by one of the most recognisable works by Vera Molnar, “Structure des Quadrilateres” (1989).

The first thing to notice is that “*Structure des Quadrilateres*” is a series of works with many variations over 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, p. 188):

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

Thus, many images can be obtained from an initial grid. In this description, we can see that “*Structures des Quadrilateres*” is not a fully static object but has a dynamic component which will result in different physical “aesthetic objects” that the artist could not foresee from the beginning.





from the Series Structure des Quadrilateres (1970) - Vera Molnar

In (MuDA, 2019), she mentions how computer-generated randomness can replace intuition to make interesting art. This leaves even more room for undiscovered possibilities and adds to the dynamicity of her works. Computer randomness is one of the recurrent topics in generative computer art. See (Pearson, 2011) and (Bohnacker, Gross, & Laub, 2012) for more examples.

Something to point out in the work of Vera Molnar is that in her time, graphic interfaces were not as well developed as they are now. Her early works were mostly done on plotter machines. Therefore, after she had written the code, she had to wait for the machine to reinterpret into a print on the paper. That is, remediation was at the core of her practice.

“Structure des Quadrilateres” is an example of her process. She describes her creative process more generally as follows:

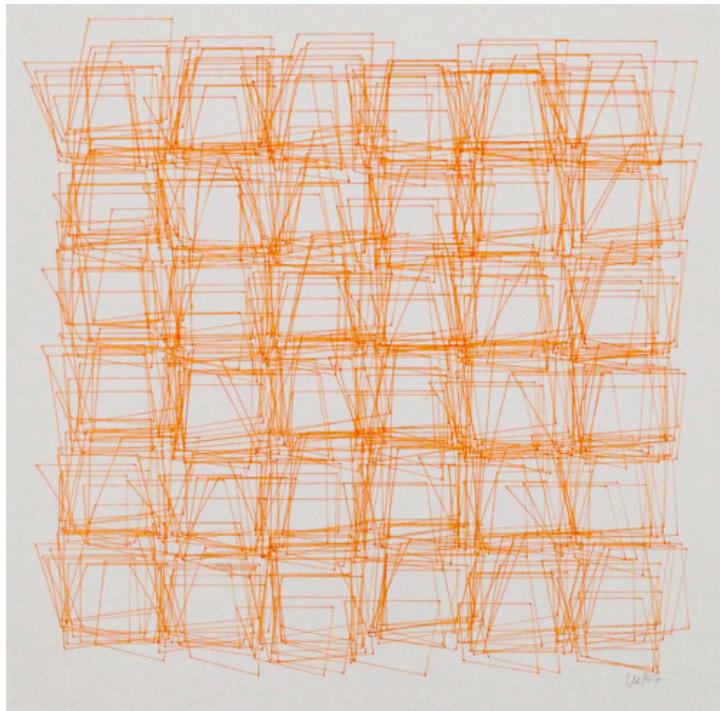
“Whenever I begin a picture, I have an initial idea of it in mind. The procedure that I use to arrive at the final work, to be described below, is tedious if carried out by hand. Furthermore, the final picture rarely corresponds to my initial idea of it.

*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, p. 186)*

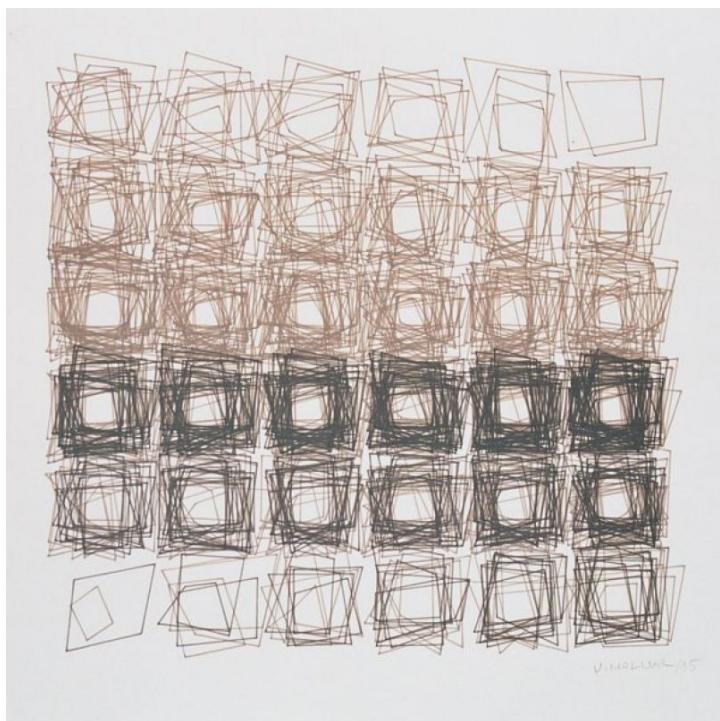
Paraphrasing (Nierhoff, 2018), a more detailed way to describe Vera Molnar’s process would be as follows:

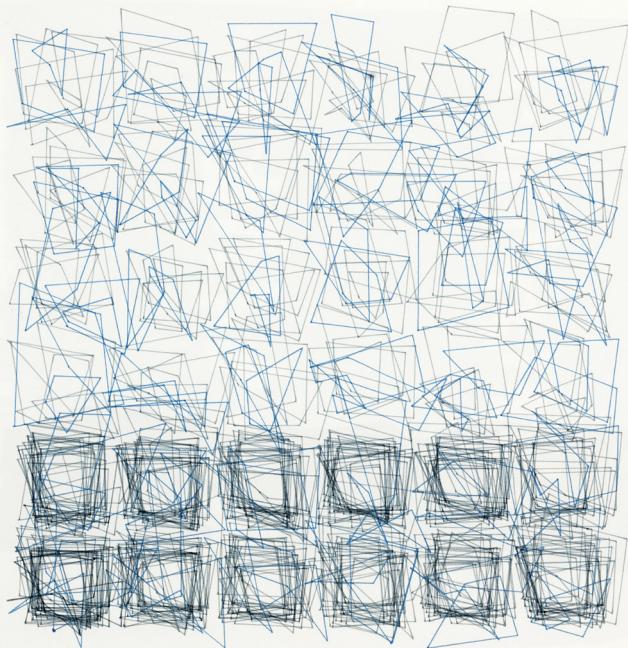
She will set up rules, follow them, and modify them according to the results. Before she had access to computers, she would become an “*imaginary machine*” for which she would execute the rules and make the results.

However, as Vera Molnar (Molnar, 1975) pointed out, this stepwise procedure has two essential 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

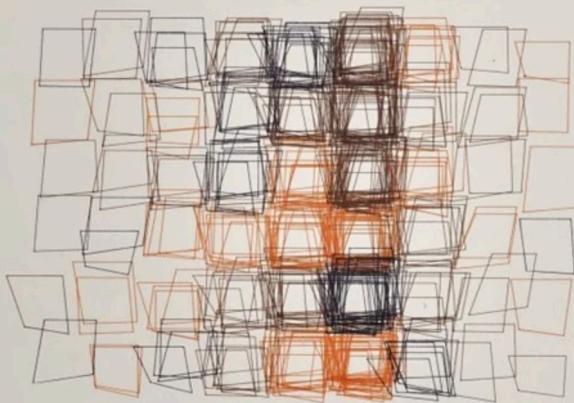


from the Series Structure des Quadrilateres (1970) - Vera Molnar





from the Series Structure des Quadrilateres (1970) - Vera Molnar



disadvantage is that, since time is limited, one can consider only a few 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 in 1968 (Nierhoff, 2018, p. 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, p. 10)

Notice how Vera Molnar talks about a “conversation” between her and the machines in these citations.

On the view of software development in the praxis of artistic life, 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, p. 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 realise that my self-generated chance was much less innovative” (Nierhoff, 2018, p. 9).

She embraced the use of computers also to conceptualise her art practice:

“Thanks to computers, the concept of form, in the broader sense, could be reduced to a lack of randomness with an organised set of elements” (Molnar & 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, p. 189)

2.3 Digital Art vs Traditional Art

Conceptual differences

In the previous section, we discussed the paradigm shift of artistic practice when computers are involved. We hinted at several points that such practicalities also implied more conceptual differences in how digital art objects are perceived when digital media are involved. In this section, we will go deeper into those differences.

2.3.1 The new digital art.

To illustrate how digital art objects challenge the traditional perception of art objects, let's recall the example of “*Structure des Quadrilateres*” by Vera Molnar; we will generalise from there.

We mentioned that “*Structure des Quadrilateres*” is a series that shares a common creation process. 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 between 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 between the artists, the work, the machine and the process?*
- *Although each series has aesthetic qualities, are two different series different aesthetic objects?*

We will address these questions in the following section.

2.3.1.1. Is it science, or is it art?

In Section 2.2.1.3, we mentioned that digital practice asks for technical craftsmanship in the praxis of artistic practice. In Section 2.2.2, we presented how Vera Molnar’s creative practice embraces this. In her case, this goes even further. In (MuDA, 2019), she describes how she systematically uses randomness to broaden her perspective

and explore the possibilities of the aesthetic object she is interested in. She goes even further in (Molnar & Molnar, 1989) using randomness to define form formally.

At first glance, it may seem that a methodological approach would not be suitable for art practices. This approach of systematic study restriction of the field of study and formal definitions is often used in science. However, this is one of the changes digital media brings to the table. Claudia Giannetti 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.” (Giannetti, 2004)

Jack Burnham places this change of paradigm in the context of scientific revolutions as follows:

*“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 intel-*

lectually 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, p. 31)

This means that digital practice requires, in addition to aesthetic considerations, conceptualisation and visualization, digital practice also requires technical craftsmanship, methodological thinking, and collaboration skills.

2.3.1.2. Digital practice vs art theory

For the new digital artist, the boundaries between science, art and technology should be diffused and purposely disrespected.

Unfortunately, Claudia Giannetti 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.” (Giannetti, 2004)

For example, the Rietveld Academy 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 in Section 1.2. The X-lab is the only workshop supporting students using coding for their practice. The X-lab has one employee and is open three days per week, 21 hours per week. The Rietveld Academy has about 850 students.

The DOGtime Program is not much different. In the six years I have been involved in the institution, 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 though one of the specialisations is called “*Interaction Design and Unstable Media*”, the graduation projects in the last five years of the department that address interaction or unstable media are more the exception than the norm.

Although the Rietveld Academy often addresses media theory and critical position to the impact of technology. As we mentioned in Section 2.2.1.3, the lack of practical skills puts the artist in a spectator position. We said, “*Art is mind over matter*” (*Mul, Creative Strategies, 2018*). Still, in the current situation, the artist remains a consumer of technology rather than someone who can collaborate with technology. This is opposite to the artists we have mentioned so far: Lazlo Maholy-Nagy, Vera Molnar, JODI, and Olia Liliana.

In summary, the new “*digital creative practice*” requires its theoretical frameworks also to embrace technical craftsmanship, methodological thinking, and collaboration skills.

Interestingly, we can find a similar situation to the one that promoted the rise of the historical avantgarde movements where art institutionalisation and practice diverged (Section 1.1.1.3).

2.3.1.3. The new “*digital art object*.”

In Section 2.2.1.2, we hinted that digital art practice accentuates a dynamic component of the creative process. This section will elaborate further on how digital media introduces “dynamic art objects”.

Claudia Giannetti (Giannetti, 2004) argues that information is the key concept to understanding aesthetic processes when digital media is involved.

“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)" (Giannetti, 2004)

This perspective implies that when experiencing an art object, we consider aesthetics aesthetic qualities such as form, colour, texture, harmony, balance, or composition. Still, in addition to these, we also should consider the information being transmitted. That is, an art object is also a mediator of information.

For example, when I visit <https://www.jodi.org/>, I can look further than the visual image into the code behind to discover even more information about the artwork. In a generative work like "Structure des Quadrilateres," I can remain only with the printed images. Still, I can also inquire into the order or aesthetic qualities that arise from randomness.

For another example, let's take the work "Match of the day" (2004–2008. Version II 2017 – ongoing) by Gert Mul.

"An image analysis algorithm compares daily about 40.000 images from 300 Television-Channels. The software then pairs images which,

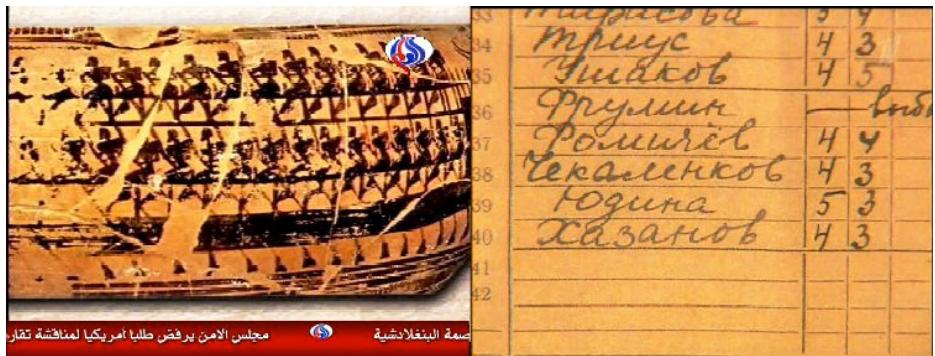
screenshot from home page of www.jodi.org/
opposite page source code view of the same page

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1 <html><title> %Location | http://wwwwww.jodi.org </title>
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3 <BODY BGCOLOR="#000000"
4 TEXT="#00FF00" LINK="#00FF00" VLINK="#00FF00" ALINK="#ffffff">
5 <font size=5><CENTER><blink><b>
6 <A HREF="10cc/index.htm">
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79 | \_____
80 | \_____
81 | \_____
82 | \_____
83 [3] _____ \_____
84 / \_____\ \_____
85 | \_____| \_____| \_____
86 | \_____| \_____| \_____
87 | \_____| \_____| \_____
88 | \_____| \_____| \_____
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90 | \_____| \_____| \_____
91 | \_____| \_____| \_____
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93 | \_____| \_____| \_____
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96 | \_____| \_____| \_____
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101 | \_____| \_____| \_____
102 | \_____| \_____| \_____
103 | \_____| \_____| \_____
104 | \_____| \_____| \_____
105 | \_____| \_____| \_____
106 [9] \_____
107 | \_____
108 | \_____
109 | \_____
110 | \_____
111 | \_____
112 | \_____
113 | \_____
114 | \_____
115 [6] \_____
116 [11] \_____
117 | \_____
118 | \_____
119 | \_____

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selection of image matches from Match of the Day (2004-ongoing) - Geert Mul

according to the algorithm, make a good visual match. The A.I. does not understand or even sees images; it just applies pixel statistics and calculates the visual similarity. But people can't help to assign meaning to similar images. The matches put together by the computer trigger sensations of poetry, humour, beauty or disgust in the eye of the beholder. The artist is playing with our inability to 'see' without interpretation, and the computers inability to 'just calculate' without bestowing meaning.' (Mul, Match of the day, 2016)

As Gert Mul points out in the description of the work, we still try to assign meaning to the matches. Moreover, he explains that perfect matches or total random matches are not that interesting. It becomes "interesting" when the algorithm is set more in a middle point where the match is not immediate but not that random to ignore. In other words, the work becomes interesting when we feel there is some information to reveal, but it is still unclear to us.

Claudia Giannetti expresses these ideas further as follows:

"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.” (Giannetti, 2004)

Until here, we could argue that there is nothing special about digital media. A painting is also a mediator of information. Even more, it is well known that objects that are too literal or illustrative with their message are not immediately seen as artistically interesting.

However, the situation changes when a digital object changes or reacts to its environment. For example, with the Light-Space-Modulator, every time the machine is on, the experience will be affected by so many factors that each run, even if similar to other runs, becomes unique. That is hardly the case with a traditional art object like a painting. They have a “*static*” nature. That is, the components and message embedded by the artist (the transmitter) remains the same. In works like “*Structures de Quadrilateres*” or “*Match of the day*”, even the artist does not know beforehand what will come out.

The mutability of an art object puts it at a different level from

the traditional arts. Jack Burnham expresses the importance of mutability as follows:

“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, p. 32)

Claudia Giannetti 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.” (Giannetti, Digital aesthetics: Introduction, 2004)

Moreover, she claims that we should renounce the romantic idea of viewers of art being “*passive consumers*” dissociated from the work of art itself. Jack Burnham also aligns with this: “*Rather the object art has become a stage towards further rationalisation of the aesthetic process in general.*” (Burnham, 1968, p. 32)

Although digital media is not necessary to achieve this dynamicity,

as discussed in Section 2.2.1.2, it comes naturally in the creative process. But even more, the computer naturally offers a medium to break from the “*static*” traditional art object. Digital art objects ought to fly free like birds in the sky. If digital art does not break from the conventional paradigm, it is just a digitalisation of its physical counterpart. That is just a pretty bird in a cage.

2.3.2 Relation to the avantgarde

In this chapter, we have illustrated how digital art practice is made for different paradigms on the creative process (Section 2.2.1) and how the digital art object deviates from traditional perspectives 2.3.1. This and its relation to the other avantgarde principles was already foreseen in 1986 in an earlier version of the *Unstable Media Manifesto* by V2_ (V2_, 1986). In this version they not only aim to define unstable media, as in the version of 1987, but also address how unstable media requires a new type of aesthetics that ruptures from the “*traditional*” aesthetic and audience of fine arts. 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 STATE-
MENT 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 VISI-
BLE, TANGIBLE, AND AUDIBLE.*

*ART MUST BE FUNCTIONAL. WE SEE ART AS A FORMATIVE
PRINCIPLE IN SOCIETY. ART MUST UTILISE 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 MISER-
ABLE 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 REALISE 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 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 of art institutions, questioning the autonomy of art, and challenging the status quo.

2.3.3 Illustration: Rafael Rozendaal The internet as canvas

We illustrate the transformative shifts mentioned in the chapter with the work of Rafel Rozendaal.

Rafael Rozendaal (1980-) is a Dutch-Brazilian artist considered

one of the pioneers of internet art. His exploration of the internet as a canvas will be poignant to round up this chapter.

In several of his talks, e.g. (Rozendaal, Digital Art - DLD14, 2014) and (Rozendaal, 2013), Rafael Rozendaal emphasises that the internet is his canvas. This implies that his artworks are embedded on the internet and, as such, are affected by the internet connection, type of PC, screen size, colour settings, and the user. But he also wants to embrace this thinking and not use the internet as just a s medium to digitalise his work. In his words,

"I just saw the Internet as a young child and later in art school. I thought, I can speak directly to my audience, and that's absolutely amazing. So, I decided not to treat the Internet as a portfolio but as a place for art. I didn't want to make sculptures and put pictures online. I said no, the browser is my canvas, and I'm going to treat it with respect." (Rozendaal, Digital Art - DLD14, 2014)

Here, he embraces several of the ideas we have presented. First, the art object is no longer a physical object. Second, the art object is exposed in another medium and place than the one provided by the traditional art institution. And finally, the idea that the digital art object is no longer focused exclusively on the art object itself but on

its process, system, and context.

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 take into consideration that the viewer may have another set-up than the one he has. Once the artist addresses these considerations, it is, and then it is up to the user to create the work by clicking on the screen. In other words, Rafael Rozendaal reformulates the roles of the maker and the viewer of a work of art. The artist is a facilitator for the user to become the actual creator of the work of art. Here is his description of the work:

“...Here’s another example [of an artwork with] just 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. The screen might be someone’s computer, but they could also look at it on their phone.

It’s like this: you start with some colour, and then you set a point, and the screen is divided into four sections, and you set another point, and so on. It’s a dialogue between you and me because I’m making a set of rules, and you can play within those rules. So it has 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, Digital Art - DLD14, 2014)

He points out that his work must be part of the praxis of our everyday internet experience.

"...we're used to being on the internet. We see the work and forget about the device, but when we go to the exhibition space, suddenly, a computer is an object. You're no longer in that dream area when you're at home, and you forget about where you are." (Rozendaal, Digital Art - DLD14, 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, democratising access to art in ways inconceivable within the confines of traditional art institutions.

He was also one of the first to promote an alternative art exhibition format for digital art. The "*Bring Your Own Beamer*" (BYOB) exhibition format. The organisers facilitate a space where projections with beamers are possible; they facilitate technicalities like power supplies

and dimmed light. Then, everyone who brings a beamer is welcome to project their work. There is a no-jury rule, but unlike what we saw in Section 1.1, no one has ever been rejected. But also, BYOB has never claimed to be an institution that welcomes every type of digital art. Rafael Rozendaal made BYOB an open-source exhibition format that anyone can use to facilitate the proliferation of digital art.

III

ORIGINALITY IN THE DIGITAL AGE

3. Originality in the digital age

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

In digital art, replicability is not a flaw but a feature. Internet pioneer Steward Brand captured it under the slogan:

“Information wants to be free”.

From a purely 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 the 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 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 the new digital aesthetic is about information flows, what does “*information wants to be free*” imply for the digital creative practice?

3.1 Originality as a myth of traditional art

Before going deeper into originality in digital art, let’s look back to traditional arts.

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

He introduces the concept of the “aura” associated with 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, p. p3)

In other words, the historical context of an original piece cannot be replaced by even the most perfect reproductions of it. However, notice that such a line of argumentation diverges from the art object itself. It is about the art object in a context and the “aura”, which is only subjectively defined. This argument relies on what we know about the original object. Jack Burham builds on this to criticise Walter Benjamin’s perspective:

“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 transubstantiated 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, p. p14)

Here is essential to notice that digital emerges art from a different tradition than fine arts. The exhibition “*Behind the Screens - 50 years of digital art*” (2023) at the CODA Museum in Apeldoorn shows that the first digital artists were interested in using the computer for its aesthetic properties and not placing it in perspective to traditional arts. For example, as we mentioned in Section 2.3.3, Rafel Rozendaal is interested in using the internet as a canvas and putting into perspective traditional arts. The art collective JODI wants to embrace the dysfunctionality of technology on its own.

Following Jack Burham, in traditional arts, we have:

“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, p. p40)

Which is just not the case with digital objects. Since reproducibility is not a fault but a feature in digital art, the problem of replicability is more an issue of fine arts than digital art. It becomes a problem for digital art when it tries to force itself into the historical tradition of the art practice. For example, as we saw in Section 2.3.1, it would be an issue with digital artworks that are just digitalisations of physical counterparts.

Even if we follow Walter Benjamin, the “aura” of digital artwork is not on its presence in time and space relative to traditional arts. At best, it would be for its position in the tradition of digital art.

3.2 From web 1.0 to NFT’s

As we saw in Section 2.1, our relationship with technology has become very entangled. The internet has been one of the main drivers

for this. In less than 30 years, the Internet and the World Wide Web, or the Web, have transformed how we interact with media. As we saw with Rafel Rozendaal or JODI, artists have not ignored this.

In the last years, a “*solution*” for the problem of originality raised from the interconnected world. Namely the infamous *Non-Fungible-Tokens* (NFT’s). In this section, we will recall the rise of NFTs, and in Section 3.3, we will discuss whether this is a solution with two examples.

First, let’s go back to the World Wide Web. Its first iteration, 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, which are broadcasted and consumed via a screen. One of the key characteristics of that “*old*” media is that there were few information creators, and most users were information consumers. Because of this, information creators have a lot of control over the information 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 the 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 consumer but also the participant and creator of the information. In addition to this, the availability of information moved towards an on-demand model. We do not have to wait until 20:00 to get the news of the day on the TV, but we can access the news at any time we want.

In addition to this, the Web facilitates the interconnectivity of several devices. 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.

Rafael Rozendaal's work, Section 2.3.3, 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 decentralisation as digital natives in its conception.

3.2.1 Non-Fungible-Tokens

A key technical feature of Web 3.0 was the introduction of Non-Fungible-Tokens (NFTs).

Putting the technicalities aside, an NFT is a digital medium that allows the tracing of digital assets. A more extended technical description could be as follows:

A Non-Fungible-Token (NFT) is a unique digital identifier that cannot be copied, substituted, or subdivided, recorded in a blockchain, and 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. Any NFTs can be created by anybody and require few or no coding skills. 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.

Thanks to their immutability and traceability, NFTs were first promoted as the solution to the problem of originality in digital art. Even more, because in WEB 3.0, ownership is a crucial feature, NFTs would allow artists to be free from the middle parties dominating the art market. Artists could have full ownership of their digital assets. They would be recognized and fairly paid for the work.

This idea was well aligned with the avantgarde principles of rejecting art institutionalisation.

NFTs had a boom in 2021 and stormed into the art world. On

the commercial aspect, the work “*Everydays: The First 5000 Days*” (2021) by Beeple sold for over \$69 million, which makes it the most expensive NFT bought by a single person. Art galleries were ready to jump into the new market. Sotheby’s launched the “*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. Nowadays, the trade of NFTs is “*regulated*” by marketplaces like <https://opensea.io/> or <https://super-rare.com/>.

With the market’s over-saturation, upcoming artists can’t be noticed without investing a lot of time in PR and networking. Alternatively, artists need some intermediary to promote their NFT art. We are back at the starting point where some autonomous institutions regulate the art market.

On the technical side, 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. Notice that “*minting*” requires the precise definition of the object to be made available. The immutability of the blockchain implies that what is decided at this point can never be changed again. That is, minting promotes the creation of static, finished art objects.

Theoretically, any digital assets can be minted, i.e. become an NFT. However, we see that images, gifs, and videos in the NFT’s art markets make most of the items available. In other words, most of the items available in the NFT’s art markets are digital mimesis of physical counterparts. In other words, they are 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.

Artists could mint other objects instead of the “*final product*”, for example, the script with the code or the complete application needed

for the digital artwork to run. However, this does not happen, primarily due to the market demands. The NFT's audience asks for digital representations of traditional physical art objects. This brings us back to the 1986 Unstable Media Manifesto, where we ask for a new art form and a new audience.

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

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

3.3 Illustration, CryptoPunks and Bored Ape

We will now look at two examples of NFTs to discuss whether NFTs solve the problem of originality and how they relate to our

discussions in Chapter 2.

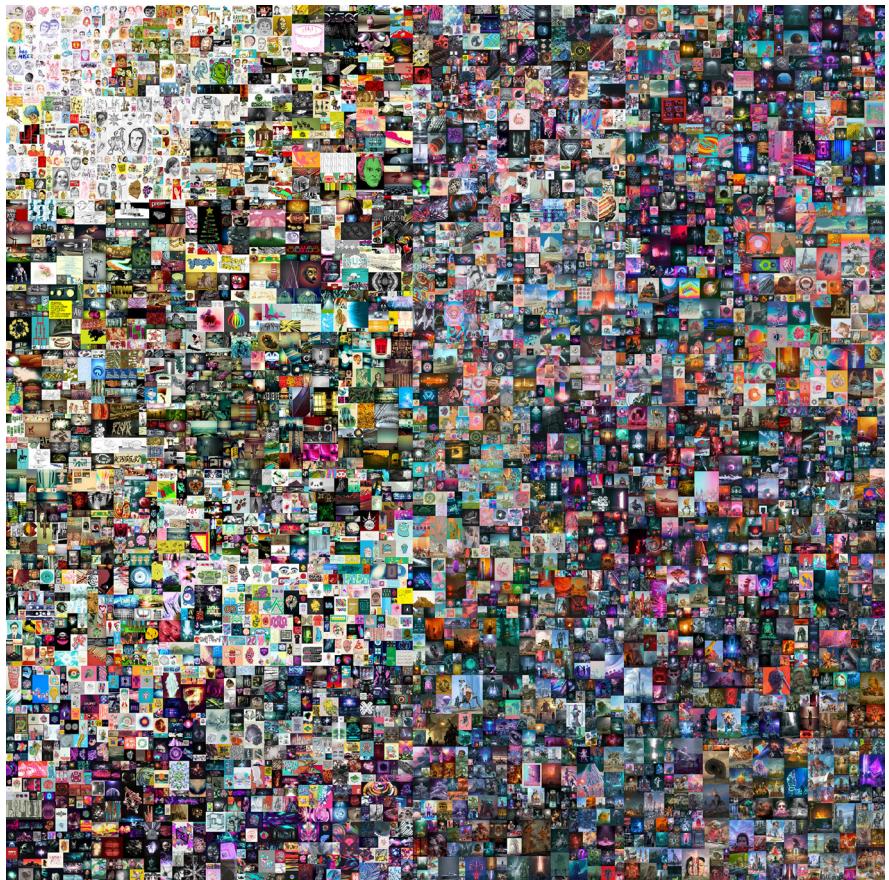
Here, we will look at CryptoPunks and Bored Ape Yacht Club. These examples are “series”, a pervasive pattern found in NFT art.

CryptoPunks were launched in 2017, before the NFT boom of 2021, and were initially free. Seven CryptoPunks are listed in the “*Top 20 Most Expensive Sales of All the Time*” (Langston, 2023).

“*CryptoPunks are a set of 10,000 unique digital collectable 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 Cryp-toKitties, Bored Ape Yacht Club and CrypToadz.” (kraken.com, 2022)

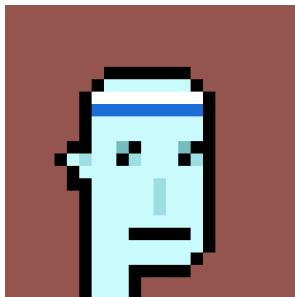
Similarly, The Bored Ape collection was one of the most iconic collections in the 2021 NFT boom. These came in the news and were the topic of several lunch discussions. They reached their top on Bored Ape 8817, which sold for 3.4 million dollars in an auction facilitated by Sotheby’s. The same action was the public launch of Sotheby’s



Everyday: the first 5000 days (2007-2021) - Beeple



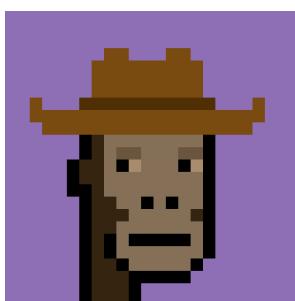
Bored Ape #8817 (2017) -BoredApeYachtClub



#8857



#7804



#3100



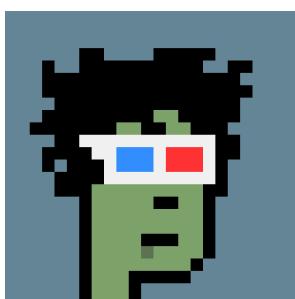
#5577



#4156



#7523



#5822

Most expensive CryptoPunks (2017)- LarvaLabs

Metaverse branch. (GMTA Software Solutions Pvt Ltd, 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 colours and accessories.” (kraken.com, 2022)

3.3.1 Review of the art objects.

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

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

For example, CryptoPunks can have seven attributes with over 100 possibilities each. The total number of combinations is larger 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 possibilities.

This is opposite to the principles we saw in Section 2.3. As only 10.000 were minted, CryptoPunks and Bored Ape have become static objects at the same level as a painting. That is, they go against the dynamic perception of digital aesthetic objects.

Both collections use elements of randomness, but not in the way 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 viewer's interaction when buying a lottery ticket.

Let's recall Claudia Giannetti's perspective 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, does not influence the art object. In that sense, a CryptoPunk or Bored Ape is a static object dissociated from the viewer. In that sense, they can only acquire "*value*" based on the tradition behind it, just like a Rembrandt or a van Gogh.

As a final point, even though CryptoPunks and Bored Ape use state-of-the-art technology, they do not follow the avantgarde principles we described in Section 1.1. Hence, not because a work uses the latest technology, it makes it an avantgarde work of art.

In conclusion, CryptoPunks and Bored Ape are examples of digital art practices that are cloning traditional art establishments into the digital world. They do not embrace the powers of digital media.

3.4 Illustration: Life forms

Let's now look at another NFT example more aligned with the principles 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 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. This concept is interesting as art objects are not usually perceived as living entities.

In addition, these artworks make great use of technology and embrace their possibilities. Imposing the condition that the artwork must be given away within 90 days, or it dies, embraces the possibilities of the blockchain and involves the viewers/owners with the artwork. The immutability capabilities of the blockchain and smart contracts make this work impossible before NFTs.

3.5 Summary

We discussed how the problem of originality incarnates into digital

objects. We concluded that the “problem” is not a “problem” of digital art practice but a problem of traditional art institutions. This relies on the establishment that romanticises 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. That is when digital art does not embrace its nature, as discussed in Chapter 2, but tries to become a digital version of traditional art.

Digital art tradition ought to embrace reproducibility. The “aura” of a digital artwork is not on its presence in time and space relative to traditional arts. At best, it would be for its position in the tradition of digital art.

The promise of NFTs to save the art world by removing the middleman and empowering artists to make a living is still to see its realisation. In fact, after the NFT boom of 2021, the market is no longer as profitable and has either returned to traditional establishments

and institutions or has become a niche for enthusiasts.

Finally, how most NFTs are produced and consumed today mimics their physical counterparts and does not embrace their digitality and the full potential of digital art and NFTs. The question here is: *What is the right thing to mint?*

IV

CONCLUSION: TOWARDS A DIGITAL AVANTGARDE

4. Conclusion: Towards a Digital Avantgarde

This thesis began with a personal exploration, seeking to harmonise my engagement with unstable media and interactive practices with the more conventional realm of “*Expanded Painting*” encountered at the Rietveld Academy.

By looking into avantgarde art theories, Section 1.1, and examining the aesthetics of digital art through a cybernetic lens, Section 2.3, set the stage for contextualising the nuances that rendered my practice seemingly incongruent within the framework of “*Expanded Painting*. ” In short, aesthetic theories rooted in cybernetic thinking embraced the digital art object’s dynamism, instability, and transformative potential,

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, emphasising that these challenges arise precisely from the attempt to digitise physical art objects rather than embracing their inherent digital nature. Institutions like the Rietveld and DOGtime perpetuate a divergence between art theory and digital art practice rather than fostering convergence by resisting the assimilation of digital practices.

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 dangerous path that will herald the end of art.

Yet, amid this divergence, beacons of convergence emerge within the Netherlands. Organisations 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 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,
WE WANT NEW ART AND A NEW AUDIENCE.”*

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

FOOTNOTES AND BIBLIOGRAPHY

Footnotes

1. Translation by chatGPT
2. 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)
3. Perhaps other female artists were exposed at her time, but the critical point is that the art world was even more male-dominated than it is now. Something that has not improved much, as is shown by the work of the Guerrilla Girls; women are still fighting for their place in the art society, and many have become artistic PR icons for the institutions to show “diversity”.

4. The Bauhaus is sometimes placed as a Modernist Institution rather than an Avantgarde movement. However, as we said, following (Drijkoningen, Fontijn, Grygar, De Meijer, & Wuerzner, 1991) we still count its educational program as one that follows the avantgarde principles we are interested in.
5. From now on, we will use the terms “Computer Art” and “Digital Art” as interchangeable of each other.
6. The idea of corporations ruling the world has existed in the Cyberpunk literature since its beginning. However, reality has shown that governmental organisations and policies lag behind technological developments.
7. Processing is a programming language specifically designed for visual arts, design, and interaction. It was created by Ben Fry and Casey Reas and is based on Java. The language provides a simple syntax and a set of libraries for drawing graphics, handling user input, and creating interactive visual applications. Processing has gained popularity for its ease of use and its ability to quickly translate code into visual output, making

it a valuable tool for creative coding, interactive art, and educational purposes.

8. In the software development industry, software is developed by teams. In fact, contemporary software development methodologies (Agile) foster success and results as a team achievement over individual achievements.
9. Some may disagree whether Vera Molnar is really one of the pioneers of computer art, but since I do not want to encourage a male-dominated culture in art and its institutions, I will illustrate the thinking behind computer art with her work.
10. This in contrast 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.
11. This is remarkable compared with famous artworks like Van Gogh's Sun Flowers, which are valued at around \$100 million.
12. Those are: #8857, #7804, #3100, #5577, #4156, #7523, and #5822
13. The original quote is: "We live in a society 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.”

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