Aura and Chaos: Computational Creativity and Contemporary Art Practice

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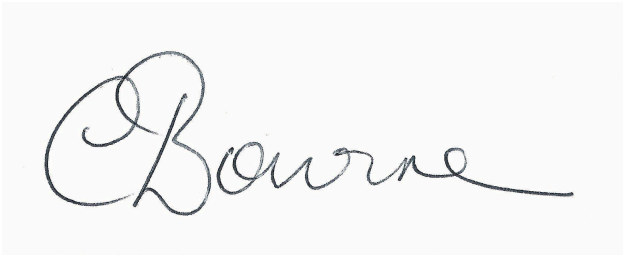
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Declaration

This is to certify that the work I am submitting is my own and has not been submitted for another degree, either at University College Cork or elsewhere. All external references and sources are clearly acknowledged and identified within the contents. I have read and understood the regulations of University College Cork concerning plagiarism and intellectual property.

Digital signature of the candidate:



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Abstract

This thesis addressed my aims and objectives by interrogating the potential of AI and digital fabrication technology as a tool and conceptual device in contemporary art practice. It explored the gap in knowledge and the dynamics of human-computer interaction between artists and computational creative systems, as well as the need for techniques and models that can capture and interpret complex artistic contexts. Computational creativity faces challenges in capturing subjective and aesthetic aspects of art, these are deeply personal and influenced by emotions, experiences, and cultural backgrounds. Integrating these elements into computational systems poses a unique challenge, as it requires addressing ethical and cultural considerations such as respecting cultural sensitivities, avoiding biases, and promoting inclusive artistic expressions. Understanding and addressing these issues is crucial for the ethical and creative use of computational creativity, specifically AI, in artistic practice.

Keywords: Computational Creativity, Digital Art, AI, Contemporary Arts Practice, Digital Fabrication, Aura

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Introduction

To situate my positionality as an artist, researcher, and educator, over the last five years, I have taught the History and Theory of Digital Art to postgraduate students at University College Cork, Ireland in tandem with my own artistic practice. During this time, the basis of the research has been a questioning of creativity—specifically the making of art—how this has changed over time in relation to technological advances, and what this means as an artist, as a viewer, and for society as a whole.

Over the last two years, AI art, that is, art that is generated by Artificial Intelligence, has become increasingly available and of interest to students and artists. This poses a new question around authorship—if the artist is so removed from the conception and creation of the work, are they the artists or is the technology? This question is also relevant to digital fabrication technology which has become widely accessible to artists, students, and the general public. And if the latter, the proposition of technology as an artist, can we still call the material outcomes ‘art’ as we know it?

My artistic practice is concerned with the landscape and cultural context, communities of place, psychogeography and the archive. My work incorporates elements of the uncanny—drawing people in with the unexpected. Materially, my work responds to the themes and communities I’m working with and

encompasses traditional art forms, performance, photography, various mark-making processes, and the digital.

I am also very interested in power structures within the process of art-making and my work explores the demarcation between community art, socially engaged art, and participatory practice from an artist's perspective. My key approaches are participatory workshops, active research, and diverse and responsive material outcomes.

The emphasis in community arts or socially engaged arts frequently centres on group involvement and cooperation. As the work is collaboratively made with participants or members of the community, the lines between authorship might become blurry. The artist could take on the role of a facilitator or catalyst, directing the creative process while allowing for other people's ideas and expressions. The final piece of art is the outcome of teamwork and collaboration, defying conventional ideas of individual authorship.

Similar concerns about authorship arise in AI art as a result of the participation of AI systems in the creative process. Questions regarding the degree of human agency and authorship in the development of these works are raised by AI algorithms that produce artworks based on existing data, i.e. existing artworks. Conversely, because massive volumes of data may be analysed

by AI algorithms, they can then yield results that are sometimes unexpected or outside the direct control of a human artist.

The notion of authorship extends beyond the individual artist in both communal or collaborative arts, and AI art. The interaction between human and non-human agency, group engagement, and the effect of algorithms or community members on the result takes on a complicated form. These situations call into question the idealised picture of the solitary genius creator and force us to reconsider how we attribute creative authorship.

My MFA (2013) from Monash University, Australia, provides a theoretical basis for this continued research into overlapping themes. That MFA research initially set out to investigate how the grotesque and abject have been situated historically, therefore giving us an idea of how the meaning of the word has changed over time and giving my practice-based research historical context. As well as looking at the chronological significance of the grotesque, I explored how the body has been the primary site of the grotesque and abject and what this implies in the modern age of technological bodily interventions.

The central focus of this thesis is the investigation of the potential capabilities of digital technology to manifest creativity within the established understanding of the concept. The objective of this doctoral research project is to develop a comprehensive framework that explores the intersection between artificial

intelligence (AI) and other digital technology, and creativity. Through this process of inquiry, this thesis proposes to provide a valuable contribution to the current corpus of knowledge pertaining to the nexus of computation and creativity—and indeed computational creativity; computers cannot think, they can only provide an amalgam of ideas already in existence.

The key question of this research is digital technology, with an emphasis on AI, and its capacity for genuine creativity. Is it capable of surpassing mere imitation or replication and producing original, innovative, and significant artistic expressions? These questions intersected with various disciplines, including philosophy, aesthetics, and cultural theory.

As more advanced AI technologies have emerged, this discussion on the nature of creativity and the potential for machines to create art has emerged as a contemporary topic of debate. The question has shifted from the mere functionality of generative tools in the creation of an artwork, to the exploration of the possibility or potential of an AI's inherent, and future, creative capabilities. AI systems like DALL-E and Midjourney, both of which create images from input text descriptions or ‘prompts’, have significantly expanded the observable creative capabilities of Artificial Intelligence in the public imagination. These advancements have seemingly effectively pushed the limits of AI's creative potential, leading artists, creators, and

critics to more profound investigations into the essence of creativity and the role of artistic agency.

Defining creativity can present challenges due to its subjective nature. There is a prevailing Western consensus that it refers to the capacity to generate novel and valuable outcomes by utilising preexisting knowledge and resources in new ways. Can AI be regarded as an autonomous artist, separate from human involvement? Can artificial intelligence produce 'art' in accordance with our cultural understanding? There exists a potential for artificial intelligence to exhibit a certain level of creativity, as it possesses the capability to amalgamate pre-existing knowledge with its algorithms and programming in order to generate novel outputs. The discourse prompts a reevaluation of conventional conceptions pertaining to authorship, creativity, and artistic agency. The continuous discourse surrounding the intersection of AI and art prompts us to engage in introspection regarding the capabilities and constraints of AI as a catalyst for creativity. It also urges us to undertake a critical analysis of the various ways in which AI technologies can intersect with, and augment, human creativity.

The possibility of AI-generated art possessing originality and value exists; but can it evoke “aura”, which refers to the unique presence and authenticity of original work, as described by Walter Benjamin? Could it be contended that in the absence of human experience and emotion, AI will be incapable of

encapsulating the comparable intangible sentiments linked to conventional art forms? My research also questions the contemporary relevance of Benjamin's theories, which have become a fundamental theoretical component of arts education.

AI employs the technique of Machine Learning (ML) to ‘train’ from datasets consisting of pre-existing artworks available on the internet (Du Sautoy 2019). I am interested in the consequences that arise when a substantial quantity of online artwork is produced by AI, and AI systems are refining their performance based on their own generated output. This presents a dilemma regarding the nature of aura that an AI-generated art piece can possess and the distinctiveness of this aura in comparison to the original artwork from which it derives.

If an AI art tool is programmed to scrape images or content from the web without the consent of the original artists or copyright holders, it could potentially infringe on their copyrights. Copyright law generally grants creators exclusive rights over their original works, including the right to reproduce, distribute, and display the work. If an AI tool is scraping and using copyrighted content without permission, it may violate those exclusive rights. In January 2023, A trio of artists launched a lawsuit against Stability AI and Midjourney, creators of AI art generators Stable Diffusion and Midjourney, and artist portfolio platform DeviantArt, which recently created its own AI art generator, DreamUp. The artists—Sarah Andersen, Kelly McKernan, and Karla

Ortiz—allege that these organisations have infringed on the rights of “millions of artists” by training their AI tools on five billion images scraped from the web “without the consent of the original artists” (Brittain 2013). However, the legal implications surrounding AI-generated art and copyright can be complex and may vary depending on jurisdiction; copyright laws can differ between countries, and court decisions may shape the legal landscape regarding AI art and copyright infringement. In some cases, AI-generated artworks may be considered transformative or derivative works, and the legal analysis may involve factors like fair use, substantial similarity, and the degree of human input involved in the creative process.

The crux of this study lies in the formulation of diverse hypotheses, which enable us to examine the ways in which artists position themselves within a dynamic and evolving framework. The comparison between mechanical and digital reproduction can be seen as a continuation of Walter Benjamin's exploration of the distinction between the “original and the facsimile” (Benjamin 1935). Benjamin's concept of aura is believed to diminish through the process of reproduction. In this context, mechanical reproduction can be understood as the production of works in the virtual realm. The concept of “material flow”, as defined by Boris Groys, expands upon the notion that artworks are produced within a specific temporal framework, thereby generating aura. However, Groys suggests that viewers engage with these artworks in a manner that combines

contextual comprehension with a forward-thinking perspective. Through this contemplative process, artworks have the potential to prompt viewers to reflect upon their own temporal existence and contemplate possibilities for the future (Groys 2016).

Although I hold a contrary view to the notion that digitisation leads to the loss of aura, as opposed to digital creation, it is crucial to conduct a thorough examination of this argument in order to provide a critical response to the current discourse. Additionally, it is important to situate virtual work within the broader context of art history and consider its theoretical and philosophical implications.

The implications of constant technological advancements on artists, viewers, and society at large are a subject of inquiry. What is the response that has been observed and is currently ongoing? To what extent did preceding art movements engage with or harness technology?

In the first chapter, I examine the linear progression of creative research, with a focus on Arthur Miller's conceptualisation of creativity, particularly in relation to AI creativity. I question the prominence attributed to the concept of genius within the Western tradition and the lack of cultural variations in the conceptualisation of creativity. I conduct an experiment investigating ideas pertaining to authorship and artistry by

fabricating a completely fictitious artist persona and portfolio of ‘fake’ artwork.

In the second chapter, "Originality and Reproduction", the examination of cultural disparities in perspectives regarding counterfeits or replicas is further pursued. This analysis examines Walter Benjamin's concept of aura and Boris Groys' contemporary response to it, specifically through the notion of material flow, as a fundamental factor contributing to a potential lack of genuine creativity in computational creativity. I proceed to examine the concept of the 'remix' in relation to the notion of originality and theories concerning the compressing influence of Internet culture on aesthetic culture.

In the third chapter, "Computational Creativity," I examine the Systems Model of creativity, with a specific focus on the insights provided by Dr Margaret Boden's writings which propose that the question of whether a computer can be creative is a philosophical question, not a scientific one (Boden 2014; 224–244). The examination of randomness as a conceptual device and the utilisation of data as a medium by contemporary artists, along with a comparison of the resulting outcomes to those generated by computers, constitute the focus of this inquiry. I continue with a concise account of the historical development of AI. This phenomenon raises questions regarding bias and ethics, and we then examine recent investigations that explore the role of emotion, or the absence thereof, as a crucial

factor in comprehending the inherent limitations of computers in terms of creativity.

In the concluding chapter of my thesis, “Speculative Futures”, an exploration is undertaken to analyse instances of technological failures and their potential to serve as sources of inspiration for artists. Despite its shortcomings, technology can still evoke creative responses within the artistic realm. The themes that are examined in this study encompass the domains of Biohacking, Cyborgs, and Robots, as well as the Grotesque and Abject. The absence of pathos, a significant intentional conceptual device, is observed in computer-generated artworks. This analysis examines the potential of artificial intelligence (AI) to serve as a source of inspiration for artists in their portrayal of speculative narratives.

Research Design

Research Questions:

Can we define Creativity and if so can computers be “creative”?

What are the implications of new technologies such as AI and digital fabrication on contemporary arts practice?

Research Sub-Questions:

Can Artificial Intelligence make ‘art’ as we culturally understand it? Can AI Art, therefore, have/engender “aura”?

How does AI-generated art challenge traditional notions of creativity and authorship?

What are the aesthetic and conceptual differences between AI-generated art and human-created art?

How can we utilise AI as a tool, or even collaborator, in contemporary art practice?

What are the ethical considerations and implications of using AI in the creation of art?

Key Subject Areas:

- Human Creativity
- Computational Creativity
- Digital Art
- Artificial Intelligence
- Digital Fabrication
- Authorship and Originality
- Contemporary Arts Practice

Gap in Knowledge: While computational creativity has made significant advancements in recent years, there are still unique gaps in knowledge and areas that warrant further exploration, specifically when considering its application as both a tool and conceptual device for artists.

Human-Computer Interaction: Understanding the dynamics of the interaction between artists and computational creative systems is crucial. How can these systems be designed to enhance the artist's creative process? What is the ideal balance between human input and computational autonomy? Exploring the nuances of this interaction can lead to more effective tools and platforms for artists.

Contextual Understanding: Computational creativity often relies on data analysis and pattern recognition, but it may struggle with understanding the rich contextual information and subtle nuances that are integral to artistic expression. Developing techniques and models that can capture and interpret complex artistic contexts is essential for enabling more sophisticated and nuanced digital creative output.

Subjectivity and Aesthetics: A significant challenge in computational creativity is capturing the subjective and aesthetic aspects of art. Artistic creation is often deeply personal and subjective, influenced by emotions, experiences, and cultural

backgrounds. Integrating these subjective elements into computational systems poses a unique challenge. Can computational models account for the diverse range of artistic preferences, tastes, and aesthetics?

Ethical and Cultural Considerations: Computational creativity raises important ethical and cultural questions. How can we ensure that these systems respect cultural sensitivities, avoid biases, and promote inclusive and diverse artistic expressions? Additionally, questions surrounding copyright, ownership, and attribution arise when using computational tools to create art. Understanding and addressing these ethical and cultural considerations are vital for the responsible use of computational creativity in artistic practice.

Long-Term Impact: Exploring the long-term impact of computational creativity on the art ecosystem is also crucial. How does the integration of computational tools affect the art market, the role of artists, and the overall perception of art? Understanding the implications and potential disruptions caused by computational creativity can help shape future policies and practices.

While this research engages with speculative themes within an arts research context, it is essential to emphasise its firm situating within the current context of technological possibility. This focus deliberately avoids addressing notions related to the

emergent aspects of creative technology, instead concentrating on the established historical framework. For instance, Lev Manovich proposes the potential for "computer-generated objects, media, situations, and experiences that do not exhibit the usual systematicity and predictability of human arts, nor are they random or mechanically juxtaposed elements meant to shock; they are not merely instances of remix aesthetics. I envision that they will possess a new systematicity not yet seen even in the most radical modern music, sculpture, architecture, photography, etc. Something that we would deeply love once we see it. Something that, like all great art before, will expand who we are as humans" (Manovich, 2019). While this proposition is intriguing, it falls outside the scope of this research, which aims to critically examine the current interplay between art and technology, rather than speculate on future possibilities. This approach ensures that the study remains anchored in verifiable and documented developments, allowing for a more rigorous, and embodied, examination of the relationship between art and technology. This methodological choice underscores a commitment to a scholarly analysis grounded in historical continuity and critical reflection, providing a solid foundation for future inquiries into the evolving landscape of creative technology.

Main argument: Technology serves as a valuable asset for fostering creativity, providing access to fabrication methods that can exceed human technical abilities. Unlike traditional digital

tools, such as clay or a printing press, which do not imitate human-like thought processes, AI introduces a unique dimension to digital creativity. However, it is crucial to recognise that AI, despite its advanced capabilities, lacks the inherent capacity for creativity. Any attribution of human-like qualities to AI is a projection or anthropomorphization, as AI operates solely based on predefined algorithms and lacks the intrinsic creative thought that characterises human creativity.

Contribution to Knowledge: By empowering artists, encouraging innovation, promoting diversity, assuring ethical use of technology, and influencing the future of artistic practice, addressing these knowledge gaps in computational creativity within contemporary artistic practice will make a significant contribution to creative research and the visual arts sector, enabling artists and others to harness the full potential of computational tools while retaining their artistic agency, leading to a vibrant and dynamic art ecosystem.

Objectives:

1. To investigate the impact of theoretical works on digital art practices.
2. To explore the use of digital tools in creating art inspired by theoretical themes.
3. To develop new methodologies for arts-based research that integrate digital technologies.

4. To document and analyse various creative processes of integrating theory, and digital practice.

Theoretical Framework

Key Component:

1. Arts-Based Research (ABR)

Sub-Components:

2. Interdisciplinary Studies
3. Practice-Led Research
4. Phenomenology
5. Cultural Theory

1. Arts-Based Research (ABR)

Arts-Based Research (ABR) is the primary methodological approach for the project. ABR utilises artistic processes and forms as both the method and output of inquiry, emphasising the creation of art as a way to generate and communicate knowledge via the integration of artistic practice and academic inquiry within research, and the aesthetic dimension of knowledge production. ABR is the best framework for this research because it inherently values the creative process and the production of tangible art objects as central to generating knowledge. ABR embraces the fluid, exploratory nature of artistic practice, allowing for a seamless integration of digital and material elements. This approach fosters a holistic understanding

of how AI and traditional art forms can interact and enhance each other, highlighting the unique insights that emerge from their intersection. It also embraces irony, play, and failure (integral elements of my studio research and artistic practice) as legitimate methods for analysis of the themes.

ABR supports the use and combination of diverse methodologies, encouraging artists to employ both digital technologies and hands-on techniques in their research. This flexibility is crucial for projects that bridge AI-generated content and physical artwork, as it acknowledges the importance of both the conceptual and the material in the creative process. By prioritising artists' experiential knowledge and intuitive engagement with their medium, it creates a space where the tactile, sensory experiences of working with physical materials are as valued as the intellectual explorations of AI. ABR emphasises the role of the artist-researcher as a reflective practitioner, constantly engaging in a dialogue between theory and practice. This reflective process is vital for understanding the implications of integrating AI with traditional art forms, as it allows me to critically assess how digital outcomes translate into material expressions and vice versa with a focus on reflexivity that ensures that the research remains grounded in my own embodied experience.

This framework also recognises the power of art to communicate complex ideas in ways that are accessible and emotionally

resonant. By responding to AI-generated material by creating material outcomes, I am able to produce works that engage viewers on multiple levels, making abstract or technical concepts more relatable and tangible. This communicative potential is particularly important in interdisciplinary research, where the goal is often to bridge gaps between different fields and audiences. ABR values the unique, emergent knowledge that arises from the creative process itself, its emphasis on innovation and discovery aligns with the exploratory nature of my research.

2. Interdisciplinary Studies

Interdisciplinary studies, the combination of multiple academic disciplines within a specific study, provides a framework for integrating technology, cultural theory, and digital arts, encouraging a dialogue between different fields of knowledge and disciplinary perspectives, fostering a dialogue that enriches multiple fields.

3. Practice-Led Research

Practice-led research prioritises the integration of artistic practice as both the primary subject and methodological approach of inquiry. In this framework, the creation of art is not only the focal point of study but also the means through which research is conducted. My engagement with practice-led research involves a continuous reflective cycle, wherein my creative process is documented, analysed, and iteratively refined. This approach

aligns with established models of reflective practice and iterative cycles of making and critical reflection.

For instance, my project *Disasters of AI* exemplifies this methodology. This work involved researching historical artworks, selecting those with visual dynamism and diverse narratives, and using AI to reimagine them. Throughout this process, I engaged in reflective practice by continually prompting the AI, analysing the outcomes, and selecting the most impactful results. This iterative cycle included creating digital collages, digitally fabricating printing plates, and rigorously testing and reprinting to refine the final output. My experiential knowledge as an artist-researcher informed each step, demonstrating the vital role of practice-led research in advancing both artistic and academic inquiry.

4. Phenomenology

Phenomenology provides a lens for exploring the lived experience of engaging with literature and digital tools, focusing on the subjective, first-person perspective of the artist-researcher. I have applied phenomenological methods to capture the diverse lived experience of my creative practice, offering insights into the subjective experience of integrating literature, theory, material processes, and digital tools to illustrate and analyse the embodied experience of art-making, and the intentionality of consciousness in creative processes.

5. Cultural Theory

Cultural Theory helps contextualise the research within broader socio-cultural and historical frameworks, examining how literature and digital art practices reflect and influence cultural dynamics. I situate my work within cultural theory to understand and articulate its broader socio-cultural implications and contributions, the relationship between culture and power, and the role of art in societal change.

This theoretical/conceptual framework provides a comprehensive and multifaceted foundation for this PhD research. It integrates methodological approaches (ABR, practice-led research), disciplinary perspectives (interdisciplinary studies), and philosophical underpinnings (phenomenology, cultural theory) to support and guide my explorations in an experimental studio setting.

Other frameworks considered include Posthumanism and the Anthropocene. Posthumanism is not a suitable framework for this research because it inherently prioritises the dissolution of boundaries between human and machine, as well as the digital and the material. Posthumanism emphasises the transformation of human experience through technology, often projecting a future where human and machine are indistinguishably integrated. In his essay *What's Wrong With Posthumanism?* (2013), Richard Coyne proposes that:

Posthumanism valorises science and the Enlightenment project in ways that postmodernism tried to arrest. It also shifts the shock of the carnivalesque, the surreal, of obscene hybridity into a universalizing transformative project. To my way of thinking, Posthumanism of the literal variety is a kind of unregenerate technoromanticism.

The Posthuman perspective tends to value digital over physical, seeing material forms as obsolete or secondary to digital advancements. In contrast, artistic research that begins with AI-generated outcomes but culminates in tangible, material forms seeks to engage with the physical world in a deeply rooted and meaningful way. It acknowledges the importance of sensory, tactile, and spatial experiences that digital forms alone cannot fully capture. By translating digital processes into analogue forms, such research underscores the persistence and relevance of the material, emphasising human connection to the tangible world. This approach also invites a critical reflection on the limits and implications of AI, grounding technological advancements within the context of human experience and physical reality. By framing artistic research within a posthumanist context, there is a risk of neglecting the unique qualities and insights that material forms bring to the artistic process. Instead, a framework that values both digital innovation and material craftsmanship can foster a more holistic and integrated understanding of the relationship between technology and the physical world, ultimately enriching artistic exploration and its outcomes.

However, the consideration of Posthumanism, even if discarded, has been integral to analysing the current techno-theoretical landscape as an element of this research.

The Anthropocene is not a relevant framework for this artistic research because it centres on the impact of human activity on the Earth's geology and ecosystems, often highlighting themes of environmental degradation, climate change, and ecological crisis. While these are crucial global issues, framing artistic research within the Anthropocene can impose a narrow focus on environmental narratives, potentially overshadowing other important dimensions of the work, such as the interplay between technology, human experience, and materiality. The Anthropocene framework, with its emphasis on large-scale environmental impact and geological time scales, does not adequately capture the nuances of the human-material relationship located specifically within the timeframe of this research. Additionally, the Anthropocene framework tends to emphasise the destructive aspects of human technological advancement, and while I have incorporated themes of speculative futures, and techno utopias/dystopias into the experimental studio based research, by framing the research as a whole within the Anthropocene there is a risk of reinforcing a dystopian narrative, which can detract from the imaginative, and hopeful aspects of combining digital and material forms in the research outcomes.

Methodology

Arts-based research (ABR) focuses on the process and creation of art as a means of inquiry. This project will employ a combination of qualitative and experimental methods, including:

1. Literature Review:

A comprehensive review of literature on both definitions, and cultural implications, of creativity, originality and reproduction, aura, digital aesthetics, computational creativity, the grotesque, and the relationship between digital technology and visual arts.

Identification of key themes, methodologies, and gaps in the current research and mapping of how these themes interrelate.

2. Experimental Studio Practice:

Phase 1: Theoretical Exploration:

Analysis of a range of theories.

Phase 2: AI and Digital Tool Experimentation:

Experimentation with various digital tools (e.g., AI, digital etching software, 3D modelling, digital print technology) in the studio.

Experimentation with various AI tools.

Documentation of the process of learning and integrating these tools into the creative practice.

Phase 3: Creative Synthesis:

The creation of a series of art pieces that integrate ideas and processes from the selected themes using digital tools.

Experimentation with different forms and formats.

3. Data Analysis:

Analysis of the documented process, reflective journals, and feedback to identify patterns, themes, and insights.

Use of qualitative methods such as thematic analysis to interpret the data.

Creation of a narrative that weaves together the theoretical insights from the literature review, the practical insights from the material experiments, and the experiential insights from the studio practice.

5. Expected Outcomes:

1. A body of artwork that exemplifies the integration of material based practice and digital tools.
2. A deeper understanding of the creative process in the context of digital arts.
3. New methodologies and frameworks for arts-based research that incorporate digital technologies.
4. Contributions to the discourse on contemporary art practices and the role of digital tools.

Timeline:

Year 1: Literature review, selection of case study artists, initial studio experiments.

Year 2: In-depth case studies, continued studio practice, documentation, and reflective practice.

Year 3: Creative synthesis, public engagement, feedback collection, data analysis.

Year 4: Finalisation of artwork series, writing of dissertation, defence, and dissemination of findings.

Epistemological position

Given the nature of my PhD project, which integrates arts-based research (ABR), interdisciplinary studies, digital humanities, and practice-led research, the most relevant and appropriate epistemological position would be Constructivism. Constructivism as a positionality (as differentiated from the early twentieth-century art movement) posits that knowledge is not passively received but actively constructed by individuals through their interactions with the world, it is ‘an approach to learning that holds that people actively construct or make their own knowledge and that reality is determined by the experiences of the learner’ (Elliott et al., 2000, 256). In the context of my research, this means that the insights and knowledge generated through my artistic and digital practices are constructed through my creative processes and engagement with literature and technology. Constructivism recognises that there are multiple ways of knowing and understanding the world. This aligns with my interdisciplinary approach, where literature, art, and digital tools each offer different perspectives and modes of inquiry.

In constructivist research, the researcher is an active participant in the knowledge construction process. This is particularly relevant in arts-based and practice-led research, where my role as an artist-researcher involves direct engagement in creative practices. My reflections, experiences, and interactions with digital tools and literary themes are integral to the knowledge generated. This knowledge is contextual and situated within specific social, cultural, and historical contexts. The research will explore how contemporary art- and critical- theory and digital technologies shape and are shaped by the cultural context in which they exist. This involves understanding how, as an artist-researcher, my personal and cultural background influences the creative process and outcomes, constructivism acknowledges this subjective nature of knowledge and the importance of reflexivity which involves critically examining my own role, biases, and assumptions in the research process, which is crucial in documenting and analysing my creative practice.

As an arts practitioner with extensive experience in community and socially-engaged artistic processes, I see my methods of working and interdisciplinary approach as a form of experiential knowledge construction, with each method and approach allowing for unique, constructed perspectives. This, combined with my extensive research and creative outputs in the digital art field have engendered me with a sense of digital tools not just as mediums but as active participants in the construction of

knowledge, and that experimenting with these tools constructs new ways of understanding and creating art.

This combination of digital and community/participatory/social practice allows me to maintain a reflexive stance, wherein I continually reflect on how my interactions with diverse collaborators, various phenomena, and digital tools influence my creative outputs and the knowledge they generate. This reflection allows for a dynamic engagement with, and critical analysis of, the documentation of my creative processes wherein I consider how my subjective experiences and contextual factors have shaped the outcomes.

Adopting a constructivist epistemological position provides a coherent and supportive foundation for this research. It aligns with the principles of arts-based research, interdisciplinary studies, and practice-led inquiry, emphasising the active, subjective, and contextual nature of knowledge construction.

Ontological position

Relativist Ontology posits that reality is not a singular, objective entity but consists of multiple realities that vary across different contexts, cultures, and individuals. In my research, this means acknowledging that the realities constructed through literature, digital tools, and artistic practice are diverse and multifaceted. According to relativism, reality is context-dependent. This aligns

with my studio-based research's interdisciplinary nature, where the intersection of literature, digital arts, and creative practice creates unique contexts in which different realities are constructed and experienced.

Relativist ontology embraces subjectivity, recognising that individuals experience and interpret reality differently based on their backgrounds, perspectives, and contexts. My role as an artist-researcher means that my subjective experiences, insights, and interpretations are integral to the realities I construct in this research. Relativism sees reality as dynamic and fluid, continuously shaped by ongoing interactions and practices. My research will involve iterative cycles of creation, reflection, and analysis, each contributing to the evolving nature of the realities you explore and construct.

In terms of this positionality's direct application to my research, it allows me to acknowledge that the artworks created are not representations of a single, objective reality but are constructed realities shaped by my research interactions; integrating literature, digital art, and interdisciplinary methodologies results in the construction of multiple, context-specific realities, each offering unique insights. For example, by the considered acceptance of digital tools (specifically AI) as active participants in constructing realities, the artworks produced through these tools are embodiments of the dynamic and sometimes fraught interplay between technology and artistic practice. It is worth

clarifying that a Relativist approach does not undermine the credibility of the research, but is a component of the discipline of Fine Art research. Adopting a relativist ontological position provides a coherent and supportive foundation for this research. It aligns with the principles of arts-based research, interdisciplinary studies, and practice-led inquiry, emphasising the multiple, context-dependent, and constructed nature of reality. This position provides structure in exploring and documenting the diverse realities that emerge from the intersection of literature, digital art, and artistic practice, contributing new, nuanced insights to the topics researched.

Reflection

My initial curiosity as a researcher centred around the capabilities of AI in generating art and the elusive question of whether such creations could possess aura as defined by Walter Benjamin, and latterly by Boris Groys. As I researched further into the interplay between human creativity and computational creativity, my understanding evolved, leading to unexpected discoveries, reflections, and a more nuanced understanding of the potential of AI and other digital tools as part of contemporary arts practice.

In the studio, the process of experimenting with AI tools alongside traditional methods like analogue photography, or copper sculpture created a unique synergy wherein each AI-generated output served as a starting point, a conceptual

springboard rather than a final product. This approach allowed me to infuse my personal knowledge and aesthetic decisions into the pieces, transforming the digital genesis into something tangibly human and expressive. The tactile engagement with materials reconnected me to the physicality of art-making that I initially trained in as a sculpture undergraduate, a counterbalance to the algorithmic precision of AI and the digital considerations and processes I have more recently been concerned with.

One of the most interesting revelations was the importance of context and subjective interpretation in art, a novel phenomena when working with AI specifically. While AI demonstrated remarkable proficiency in generating patterns and mimicking styles, it often lacked the nuanced understanding of cultural and emotional subtext that defines much of human artistry, and particularly my own practice which explores and interrogates themes of place, memory, mythology, community, communication, and psychogeography. This defined my role as an artist co-creator in imbuing these works with layers of meaning, contextual richness, and personal narrative. The collaborative nature of this process highlighted the evolving notion of what it means to create, and what it means to collaborate. By acknowledging the AI as a tool or machine, not a creator, but still capable of collaboration I navigated these complexities, ensuring that the final works illustrated this tension.

Literature Review

Proponents of Creative AI assert that Artificial Intelligence is capable of demonstrating creativity. These authors posit that creativity is not exclusively linked to human consciousness, but rather can be understood as a more expansive phenomenon that encompasses the capacity to generate original and valuable results by machines (Zurth 2021). The authors emphasise the capacity of AI systems to generate innovative concepts, explore nontraditional associations, and provide unique viewpoints that challenge established human assumptions. The proposition is that Artificial intelligence (AI) possesses the capability to acquire knowledge from extensive datasets and identify intricate patterns that may have eluded human observation. They argue that this ability enables AI to generate artistic expressions that are both unexpected and groundbreaking.

However, critics contend that AI is lacking in terms of subjective experiences, emotions, and intentionality, which are fundamental aspects of human creativity (Boden 2014; 224 -244). The argument agrees that AI has the capability to generate remarkable imitations or amalgamations of established artistic styles. The counter proposition is that AI lacks the ability to truly innovate and express genuine artistic creativity, and as the creative output of AI is fundamentally derived from predetermined algorithms and data-driven procedures, it is lacking the profound intricacies and nuanced artistic agency

exhibited by humans (Miller 2019). Through this thesis I will use digital technology, art theories, artwork, and critical making to interrogate these counterclaims and to build an original framework to question whether or not ‘the machine ‘has the capacity to create.

Creativity

How can new concepts emerge from those that already exist in the mind? - Plato

With a history that predates the institutionalisation and conceptualisation of research by two centuries, the idea of creativity has developed organically. Research and creativity were not initially thought to be related, and this view persisted throughout most of their histories of development. As a result, in order for there to be creativity research, the connection between creativity and research had to go through a number of fundamental philosophical shifts (Runco, 2007), and the definition and field of ‘scientific inquiry’ had to be purposefully broadened. As it was, the concept of creativity was not sufficiently removed from the countless discussions about the purpose and importance of research until 150 years after it had become a generally accepted and supported institutional endeavour.

In their chapter, *Creativity Research: A Historical View*, from *Cambridge Handbook of Creativity* (2010) Robert S. Albert and

Mark A. Runco provide a linear history of creativity studies, i.e., the research undertaken historically towards creativity itself. They posit that both the timing and the content of historical processes have significance. What will be significant will depend on ‘when’, the significance of which goes far beyond just appreciating individual creativity. It applies to theories about creativity and approaches to studying it (Kaufman and Sternbery 2010). Institutions such as museums, galleries, archives, and libraries play a critical role in selecting and contextualising the key strands of possibilities among those already existing in the work. They also propose that discussions about ideas are only worthwhile when they involve a group of people who are equally concerned about the issue at hand. This suggests that (a) there must be a critical mass of knowledge and information in place, and (b) significance and meaning are not only abstract but also result from consequences that are not all predictable (Runco and Albert 2010). This perspective makes history experimental.

We may therefore find some of the most consequential examples of creativity in Western history by studying the evolution of research into creativity over the previous 2,000 years and seeing how they eventually came to be linked in the late nineteenth and early twentieth centuries (Albert and Runco 2010). This allows us to better comprehend the nature of change, the significance of ideas in a wide range of contexts, and how these changes have influenced our current understanding of creativity.

The biblical account of creation is the source of the earliest Western conception of creativity (Morgenstein 1920), and it was this that gave rise to the notion of the artisan performing “God's work on earth” (Albert and Runco 2010):

For man’s awareness of his capacity to create, the Covenant was a landmark. It declared that a people become a community through their belief in a Creator and His Creation. They confirmed their creative powers through their kinship, their sharing of qualities of God, and their intimate and voluntary relationship to a Creator—God (Hare 2019).

Plato believed that nothing new could be created and that the goal of art at the time was to imitate or match ideal forms (Hare 2019). Originality, the crucial modern indicator of creativity, was not a characteristic of creativity in the past (Runco, 1988; Child, 1972).

Can we universally define ‘creativity” in a contemporary context? The synonyms and definitions of the terms imagination, ingenuity, innovation, inspiration, inventiveness, muse, novelty, originality, serendipity, talent, and distinct vary widely. Despite the abundance of definitions of creativity and related terms, few are commonly employed, and many researchers avoid defining the relevant terms altogether. (Kaufman and Sternberg 2019; 67). Creativity has been associated with intelligence as being one of

the three main components of intelligence, namely analytical, practical, and synthetic intelligence.

Analytic intelligence includes skills like analysing, critiquing, judging, comparing, evaluating, and assessing. *Practical intelligence* involves the ability to apply, use, put into practice, implement, or employ knowledge. And *Synthetic* or *Creative intelligence* concerns what one can imagine creating, inventing, discovering, or predicting. Creativity and generativity are therefore, by definition, associated with synthetic dimensions of intelligence. As with many other complex phenomena, such as intelligence itself, there is no single, well-accepted definition of creativity (Kaufman and Sternberg 2019).

According to R. L. Williams' (1999) observation, the utility of higher-order cognitive conceptions is inversely correlated with the clarity of their definitions. Unfortunately, most studies on creativity lack a clear definition; this lack of definition helps to explain why studies on the subject frequently contradict one another. For instance, two studies on the same aspect of creativity may yield wildly different results if they use different definitions of creativity. Due to semantic differences, people in the field start to distance themselves from one another, and others outside the field start to distance themselves since it seems no one in the field can definitively define creativity.

The numerous theories of creativity presented by Aaron Kozbelt, Ronald A. Beghetto, and Mark A. Runco in the Cambridge Handbook offer diverse perspectives on how creativity emerges and can be understood. Here are some of the key theories outlined:

Psychometric Theories: Psychometric theories approach creativity from a measurement perspective. They focus on identifying and measuring the components of creativity, such as divergent thinking, originality, and fluency. These theories often employ tests and assessments to quantify creative abilities and traits. For example, the Torrance Tests of Creative Thinking (TTCT) is a well-known psychometric assessment that measures various dimensions of creativity, such as fluency, originality, and elaboration.

Cognitive Theories: Cognitive theories explore the cognitive processes involved in creativity. They examine how information is processed, combined, and transformed in the human mind to generate novel ideas and solutions. Cognitive theories highlight the importance of knowledge, memory, attention, problem-solving, and associative thinking in creative thinking. For example, the Conceptual Blending Theory (Coulson 2005) proposes that creativity involves the blending of different mental spaces and concepts to generate novel ideas. It highlights the role of cognitive processes in forming new connections and conceptual innovations.

Personal Theories: Personal theories of creativity emphasise individual differences and personal characteristics that contribute to creative thinking. These theories explore factors such as personality traits, motivation, self-efficacy, and self-regulation in relation to creative behaviour. Personal theories recognise that creativity is influenced by the unique attributes and experiences of individuals.

Systems Theories: Systems theories view creativity as an emergent property that arises from complex interactions among various elements within a system. These theories focus on understanding the dynamic interplay of individual, social, cultural, and environmental factors that shape and support creative processes. Systems theories highlight the importance of the socio-cultural context in fostering and inhibiting creativity. For example, Csikszentmihalyi's Systems Model of Creativity posits that creativity emerges from the interaction of three components: the domain (a field of knowledge or expertise), the individual (with their unique skills and abilities), and the field (the social and cultural context in which the creative work is recognised and valued) (Csikszentmihalyi 2009).

Developmental Theories: Developmental theories of creativity examine how creativity develops and changes across the lifespan. These theories recognise that creative abilities evolve over time and are influenced by factors such as cognitive

development, socialisation, education, and cultural influences. Developmental theories shed light on the progression and trajectories of creative thinking from childhood to adulthood.

Sociocultural Theories: These theories of creativity emphasise the role of social and cultural factors in shaping creative processes and outcomes, highlighting the influence of social norms, cultural values, social networks, and collaborative practices on creative expression. Sociocultural theories recognise that creativity is not solely an individual endeavour but is deeply embedded in social and cultural contexts. For example, the *Theory of Creativity as Cultural Participation* (2012) by Teresa Amabile emphasises the importance of social and cultural influences on creativity. It highlights how cultural values, norms, and practises shape individuals' creative expression and the significance of collaboration and social interactions in fostering creativity. It is important to note that historically, institutions in the West were supported by the state or the church, which meant that social and cultural values were embedded in the institutions (Berger 1972).

In *The Artist in the Machine: The World of AI-Powered Creativity*, Arthur I. Miller discusses how, over two thousand years ago, Plato in *Meno* questioned the origins of new knowledge: how can new concepts emerge from those that already exist in the mind? “How can a system produce results that go far beyond the

material it has to work with?” (Miller 2019). This is the problem of creativity, Miller says.

Miller discusses the history of AI, from its early origins in the 1950s to the present day. He notes that AI has long been associated with creativity, with early pioneers such as John McCarthy and Marvin Minsky seeing the potential for machines to be programmed to generate creative outputs. However, only with the development of deep learning algorithms in the 2010s did AI-powered creativity truly take off. He introduces a definition of creativity that has been developed through years of research and states that creativity involves generating new knowledge through problem-solving using existing knowledge. Scientists are an example of this, as they seek to solve complex problems such as the nature of the universe and our place within it, building upon the knowledge of past thinkers to expand our understanding. More recent problems have become increasingly specialised, such as understanding evolution and identifying the basic components of life. Engineers also use problem-solving to design structures that are safe and effective, such as bridges and electrical systems (Miller 2019). Like scientists and engineers, creatives—whether artists, writers, musicians, etc.—also build on existing knowledge developed over history, beginning with set rules, which they then may ‘break' in order to produce something new and/or unique. Throughout the book, Miller explores how AI-generated content challenges traditional notions of authorship, creativity, and originality. He argues that

while AI may be able to produce works of art, music, and literature that are technically proficient and aesthetically pleasing, it is still unclear whether machines can truly be said to be ‘creative’ in the same way that humans are. Miller points out that the data and programming on which AI-generated works are based ultimately limit them because they lack the intentionality and agency inherent to human creativity.

At the same time, Miller acknowledges that AI is significantly transforming the creative process. He notes that AI has the potential to be a powerful tool for artists, allowing them to generate new ideas, experiment with different styles and techniques, and collaborate with machines in new ways. Miller argues that rather than replacing human creativity, AI will likely complement and augment it, leading to new forms of artistic expression that we have yet to imagine. According to him, the definition of creativity as the creation of new knowledge from preexisting knowledge through problem-solving is applicable to both the computer and the brain as an information processing system: “It takes into account both the final product and the process of producing it” (Miller 2019; 7).

He goes on to say that we need to distinguish between everyday creativity, little-c creativity, and great feats of creativity, big-C Creativity (Miller 2019; 6). Miller lists seven commonalities of big-C Creativity based on his studies:

1. The need for introspection
2. The need to know your strengths
3. The need to persevere, and not be afraid to make mistakes
4. The need for collaboration and competition
5. The need to beg, borrow, and steal great ideas
6. The need to thrive on ambiguity
7. The need for experience and suffering

He also identifies two “marks of genius” that he believes cannot be taught:

1. The ability to discover the key problem
2. The ability to spot connections

Miller defines “Problem Discovery” as the ability to identify a specific problem that will open a new avenue of thought and that is usually antithetical to what others in the same field are working on. He uses the example of Einstein realising in 1905 that scientists were concerned with how the electron is structured, whereas he realised that they should be examining the nature of space and time (Miller 2019). He also uses the example of Pablo Picasso wanting to create an entirely new form of representation in art that was completely different from Impressionism, the ‘problem’ being how to reduce nature to geometric forms. Picasso is further analysed in Millar’s explanation of the ability to spot connections. For inspiration, Picasso turned not to the latest developments in art making but to new developments in the

fields of science, technology, and mathematics in order to understand how to represent all perspectives of a scene at once. He created a ‘think tank’ which led him to understand the science of X-Rays and images of four-dimensional geometry (geometry with four spatial dimensions) (Miller 2019).

One facet of Miller's definition that is particularly noteworthy when seen in the context of a book on AI-Powered Creativity is the way in which it places a focus on process-driven traits that give priority to uniqueness. Notably, it appears that Miller's formulation makes a conscious decision not to include concerns of beauty or aesthetics. It is also important to recognise that the vast majority of analysis of research into creativity has been undertaken through a Western lens. (Keane, 2019).

Originality and Reproduction

Reproduction is the method by which nature produces organisms. None is created without precedent - Ledderose

A Chinese neologism, *Shanzhai* means ‘fake’ and was first used to describe counterfeit mobile phones sold under the names Nokir and Samsing. These phones were not cheap knockoffs; rather, they were multipurpose, fashionable, and just as good as or better than the originals. Since then, *Shanzhai* has become a part of other aspects of Chinese culture, including books, politicians, and celebrities (Han 2017). The originals are constantly being transformed, or deconstructed, in Chinese

culture, whereas in the West this would be considered piracy or even desecration. In *Shanzai: Deconstruction in Chinese* (2017), Byung-Chul Han explains how:

In 1956, an exhibition of masterpieces of Chinese art took place in the museum of Asian art in Paris, the Musée Cernuschi. It soon emerged that these pictures were, in fact, forgeries. In this case, the sensitive issue was that the forger was none other than the most famous Chinese painter of the 20th century, Chang Dai-chien, whose works were being exhibited simultaneously at the Musée d'Art Moderne. He was considered the Pablo Picasso of China. His meeting with Picasso that same year was celebrated as a summit between the masters of Western and Eastern art. Once it became known that the old masterpieces were his forgeries, the Western world regarded him as a mere fraud. Yet for Chang himself, they were anything but forgeries. In any case, most of these old pictures were no mere copies, but rather replicas of lost paintings that were known only from written descriptions. His paintings are originals insofar as they carry forward the 'real trace' of the Old Masters and also extend and change their oeuvre retrospectively. Only the idea of the unrepeatable, inviolable, unique original in the emphatic sense downgrades them to mere forgeries. This special practice of persisting creation (Fortschöpfung) is conceivable only in a culture that is not committed to revolutionary ruptures and discontinuities but to continuities and quiet transformations, not to Being and essence but to process and change (Han 2017).

A copy can mean two different things to the Chinese. Fangzhipin (仿製品) are imitations that are blatantly different from the original. These are miniature replicas or models that can be bought, for instance, in a museum store. Fushipin (複製品) is a further concept for a copy. They are precise replicas of the original, and to the Chinese, both are equally valuable. It is devoid of any negative associations. It has resulted in disagreement and conflict between China and Western museums owing to the difference in perceptions of what constitutes a copy. Firmly maintaining that they are not fundamentally different from the originals, the Chinese frequently send copies rather than originals abroad.

The Shinto Ise Grand Shrine, located in Ise, Mie Prefecture of Japan, is 1,300 years old but rebuilt from scratch every 20 years, not only the building but also the Temple's artefacts, which used to be destroyed but are now preserved in a museum owing to their increased exhibition value. UNESCO removed the shrine from the list of World Heritage Sites due to debate over which is the original and which is a copy. One must question if this leads to the demarcation between original and copy vanishing completely.

The East has developed a technique of preservation that removes the difference between the original and the replica, involving continual cell replacement, identity, and renewal. However this process also exists in the West, for example the German cathedral of Freiburg Minster is constantly being

examined for damage and replaced with new stones because its sandstone materiality is very susceptible to erosion. After the replacement of enough of the building's materials, you have to wonder at what point you no longer have an original structure, but a reproduction.

The historical development of the idea of an incontestable original occurred in the West, but excavations of ancient works of art were handled differently than they are now. Industrialisation accelerated the need for conservation and museumification, with the emerging disciplines of art history and archaeology recognising the importance of historic structures and works of art.

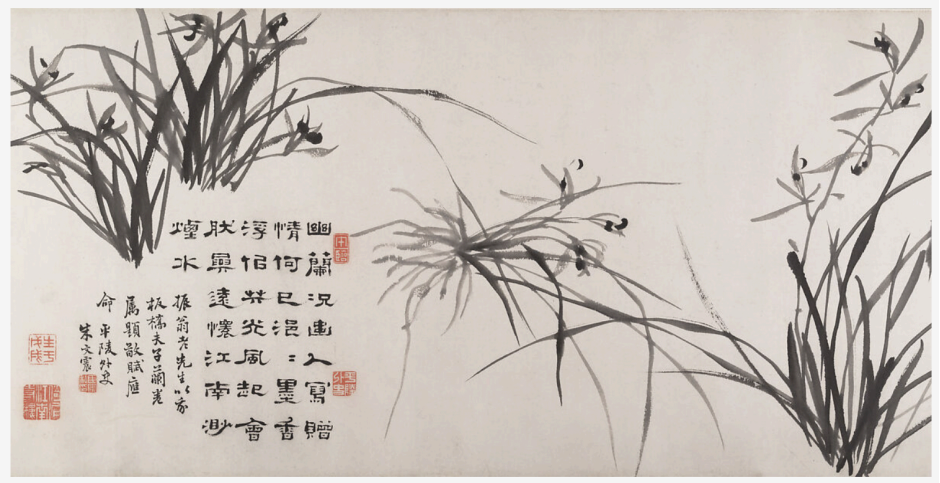


Fig 1.0: Zheng Xie, *Orchids and Bamboo,* 1742, ink on paper. Inscribed by the artist and by Gu Yuankui (juren degree, 1744); Yinxi (1711–1758); Zhu Wenzhen (1718–ca. 1778); and Cheng Duo (act. early-mid-18th century)

In *Ten Thousand Things: Module and Mass Production in Chinese Art* (2000) Lothar Ledderose states that:

Reproduction is the method by which nature produces organisms. None is created without precedent. Every unit is firmly anchored in an endless row of prototypes and successors. The Chinese, professing to take nature as their master, were never coy about producing through reproduction. They did not see the contrast between original and reproduction in such categorical terms as did Westerners. Such an attitude might be annoying when it comes to cloning software, but also led to one of the greatest inventions of humankind: the technique of printing. In the Western value system, reproduction in the arts has traditionally had a pejorative connotation. Indicative, and influential in our [20th] century, has been the view of Walter Benjamin, who declared that a work of art loses its aura when reproduced by technical means. However, recent research has uncovered that in the arts of the European Middle Ages, for instance, reproduction could indeed be used as a means to define an artistic tradition, and even to reinforce the impact of specific works. A rich and profuse body of theoretical writings in China deals with the issue of creativity, especially in the visual arts. Invariably, the creativity of humans is described in relation to the creativity of nature, which is upheld as the ultimate model. We are told that a sage of antiquity invented a script when gazing at the footprints of birds. Early treatises describe the qualities of calligraphy in terms of nature imagery such as a gentle breeze through a bamboo grove, or a phoenix soaring to the clouds. Praising an artist for "spontaneity" (ziran) and "heavenly naturalness" (tianran), or saying that he captured life

as nature does, are the highest acclaim a Chinese critic can bestow (Ledderose 2000).

Similarly, artists in the Western tradition view the imitation of nature as a paramount task, but they have pursued it in a different manner. Questions of realism, verisimilitude, and mimesis have stimulated and plagued Western artists since the competition between two ancient Greek painters, Zeuxis and Parrhasius (Hernandez 2001), to determine which of their paintings a viewer would be more likely to confuse for reality. Meiosis was not of the utmost significance to Chinese artists (only in depictions of the deceased did they aspire to realism). Instead of attempting to create objects that resembled natural phenomena, they attempted to create them in accordance with the laws of nature. These principles mimic the prodigious production of numerous organisms. Over time, minor variations, mutations, and alterations accumulate to produce entirely new morphologies (Ledderose 2000).

There seems to be a well-established Western tradition of seeking to ‘put the finger’ on those points where mutations and changes occur. The intention seems to be to learn how to abbreviate the process of creation and accelerate it. In the arts, this ambition can result in a habitual demand for novelty from every artist and every work. Creativity is narrowed down to innovation. Chinese artists, on the other hand, never lose sight of the fact that producing works in large numbers exemplifies

creativity, too. They trust that, as in nature, there will always be some among the ten thousand things created from which change springs (Ledderose 2000; 6-7).

In his chapter *Cross-Cultural Perspectives on Creativity* from The Cambridge Handbook of Creativity, Todd Lubart (quoting Geertz, 1973) states that there are various layers of the social environment, ranging from the home, school, and workplace settings through the local community and regional environment to the global or national level (Lubart 2019). The definition of culture is "a historically transmitted pattern of meanings embodied in symbols, a system of inherited conceptions expressed in symbolic forms by means of which men communicate, perpetuate, and develop their knowledge about and attitudes towards life" (Kaufman and Sternberg 2010; 265). Lubart uses the example of French culture, which he says can be defined as the collective traditions, beliefs, values, and preferred social behaviours of modern France. French culture extends beyond the confines of contemporary France, with many regions in the world having some degree of French culture. The long-evolving French culture includes a way of looking at the world as well as a common way of living and language. French culture is a component of European culture, which can be considered a part of the Western world along with several other cultural areas. French culture today differs slightly from French culture in the past, such as during the reign of Louis XIV. Additionally influenced by its current geopolitical, economic, and

social circumstances, modern France, as opposed to being a lone monarchy, is presently a Republic with a representative government and a member of the European Union. Lastly, it is important to remember that French culture is not homogeneous and that there are a number of cultural standards that differ between the north and the south of the country (Lubart 2019).

In *Evolution and Tinkering* (1977; 1161-1166), François Jacob, a molecular biologist, posits that the conceptualisation of the evolutionary process, driven by natural selection, should not be framed within the metaphorical framework of engineering. Instead, Jacob advocated for the adoption of the metaphor of tinkering. Nature, in its role as a molecular manipulator, would gradually alter its creations, continuously refining them by making adjustments such as trimming certain parts and extending others. It would take advantage of opportunities to adapt these creations in a progressive manner to suit their new purposes. In contrast to engineers, individuals who engage in tinkering activities and address the same problems are prone to generating diverse solutions. The tinkerer employs unconventional applications of materials to generate a novel artefact. The individual repurposes an antiquated bicycle wheel to construct a roulette apparatus, or utilises a damaged chair to fashion a cabinet for a radio.

Is this a good analogy to describe cultural differences in creation? Engineering vs Tinkering? As Billy Kluver remarked in

a 1966 Life magazine article, “All of the art projects that I have worked on have at least one thing in common: from an engineer’s point of view they are ridiculous” (Herath, Kroos, and Stelarc 2016; 53).

In 1936, Benjamin published *The Work of Art in the Age of Mechanical Reproduction* from France after fleeing Germany in 1932 as a member of the Marxist movement (Eiland and Jennings 2016). In what will turn out to be his most famous essay, Benjamin argues that the advent of mechanical reproduction altered not only the process of creating and disseminating art but also the very concept of what art was. He begins by stating that authenticity, which primarily applies to artistic objects, is lost as a result of reproduction. He contends that even the most accurate copy cannot fully capture a work of art's uniqueness or sense of place and time, and that a work of art's distinctiveness also stems from its place within a tradition. Historically, the focal point of ritual objects of magic cult or sacred status was an artistic object (Vassilev 2023). Later on, this evolved into appreciating artistic beauty, or art for the sake of art. The third and most important criterion was the function art played in the value of the object or in the cultic context that gave it value: the veneration of beauty, the cult of creation for its own sake, the artist or the work of art, the symbol, the deity, or the prophet.

Art becomes less reliant on ritual and more reliant on other things as it is increasingly created with reproducibility in mind. The ritualistic aspect dissolves, but Benjamin's also interested in what we get in its place. On the first page, we can see some of the intellectual contexts in which the essay was written. Section One immediately begins with the invocation of Marx and some fundamental principles of Marxist thought, largely due to the fact that Benjamin was part of the Frankfurt School, which has a Marxist intellectual tradition from the 1930s (Benjamin 1935). The school was very interested in one of the largest Marxist revolutions in the 20th century (the Soviet Revolution, 1917–1923) and tried to examine the failure of Marxist revolutionary social change. The idea that any ideologies submitted through mass media subvert the historical forces of economic change—in more simple terms, the growth and influence of mass media in the 20th century—makes it difficult for Marx's prediction of the evaporation of capitalism to occur. Thus, the Frankfurt School suggests we have to examine technologies in a deeply researched and theoretical way (Aronowitz 1988).

Benjamin has specific major arguments throughout his writing, one of which is the historicity of perception (Benjamin 1928, 1935), i.e., that human perception changes through history as technology changes. The most relevant is, of course, technological reproducibility, which is situated very much in the context of the emergence of new forms of art making and reflects

a similar change in the way in which objects produced for capitalist consumption are manufactured.

In the essay, Benjamin identifies the specific art form of cinema that he believes has a special relationship with, and is most intimately bound to, technological reproducibility (Benjamin 1935). The issue of technological reproducibility is not just about the capacity of photography to reduce the aura of artworks by allowing anyone to have a copy of them in their homes. It's also important that we have this new art form called film, which has no relation to auratic art. Benjamin contends that film is the first art form whose artistic character is entirely dependent on its reproducibility (Benjamin 1935). When he says entirely determined, he means that this is different from a reproduction of an artwork. Aura is something that is attached to the being of a thing in its purely unmediated form. You're not looking at a postcard of the mountain range; you're experiencing the fact that the mountain range is there sharing the same slice of space-time as you. This is obviously more true now in the contemporary world full of mediated images than it was in 1935. Are we experiencing the degradation of aura, via the many versions of that mountain range that you'll find online?

It is important to note that Benjamin is actually both mourning and also *celebrating* the loss of the aura. This loss of the aura is something that matters politically in Benjamin’s writings.

The uniqueness of the work of art is identical with its embeddedness in the context of tradition… A classical statue of Venus, for example, occupied a different traditional context for the Greeks, who made it an object of worship, than for mediaeval clerics, who saw it as a threatening idol. But what both were equally struck by was its singularity or, to use another word, its ***aura*** [my emphasis]. *The original way in which the work of art was embedded in the context of tradition was through worship'* (Benjamin, 1935).

The word 'tradition' and the family of words that adhere to what we might call the *ideology of traditionalism* are crucial; Benjamin is using them as if it is implied that the reader understands that there is a shared set of meanings that we all participate in. The language he uses references pre-modernism in the sense of the shift from the mediaeval religious world to the post-enlightenment world that privileges rationalism as opposed to the traditionalism of religious value.

Those terms are particularly important when Benjamin gives a precis of the history of art; he is trying to make us understand something that has been persistent throughout the history of art and that has changed with the rise of technological reproducibility. He starts with cave paintings, which originated in the service of rituals. Benjamin is reminding us that the earliest instances of representational art were not yet made with the aesthetic mode of appreciation in mind. These early etchings

were not to be appreciated as expressions of their subjectivity or anything that we might say is remotely recognisable within the sphere of art appreciation, but they're doing so in order to change the circumstances of the world such that they might say catch a bison, there was a magical purpose to these things: if I draw _____, maybe _____ will appear to me. It's important once again that Benjamin says art began in the service of ritual, which is non-rational thought; it was first magical and then religious. An ancient statue of Venus, for instance, existed in a traditional context for the Greeks, who needed an object of worship not purely for a representation of subjective experience but to have a relationship with the divine. Moving on through history, this differs from the attitudes of mediaeval clerics, who viewed the same object as a heretical idol. But what was equally evident to both was its uniqueness, i.e., its aura. In other words, despite the fact that we've moved from the ancient Greeks to their successors, mediaeval Christian clerics, it was still viewed as primarily a religious object, an object that had significance insofar as it manifested a connection between the earthly and the divine.

For the purpose of this thesis, what I distil from Benjamin is that aura is an intangible characteristic of art relating to the place and time of its conception and is destroyed via the process of reproduction. This will form the basis of my understanding of and treatment of aura in this thesis.

Boris Groys' text *In The Flow* (2016) is a response to, and an update of, Benjamin's stance. Groys explains how, in the early 1900s, avant-garde artists and writers rallied against art museums and the preservation of historical art. Driven by the same egalitarian and democratic impulse as modern politics, they asked: Why are some things favoured and valued by society while others are left to deteriorate and fade into obscurity? Conventional responses to this question were deemed outdated. Marinetti, for example, asserted that ancient Greek statues hold no greater aesthetic appeal than contemporary vehicles or aircraft. However, unlike the statues, vehicles and aircraft are left to deteriorate, or are destroyed, once their usefulness has ended (Groys 2016). "It seems that we consider the past as more valuable than the present, but this is unjust and even absurd because we live in the present and not in the past. Can we say that our own value is lower than the value of the people who lived before us?" (Groys 2016).

Groys emphasises that things and spaces should be democratic and that to "give up the museum privilege means to deliver all the things, including artworks, up to the flow of time" (Groys 2016). Groys asks "Can we still speak about art if the fate of artworks is no different from the fate of all other, ordinary things?" (Groys 2016), stressing that he means art entering the flow of time, becoming fluid, and not art that began to depict this flow as "the old Chinese art did" (Groys 2016). He likens his motivation

for the text to illustrate or develop a vocabulary around what he called the Rheology of Art, a reference to the scientific study that investigates fluids and fluidity (Groys 2016), particularly emphasising the term “Material Flow”. He asserts that “the modern and contemporary understanding of art as fluid would seem to contradict art’s original purpose: to withstand the flow of time” (Groys 2016). He outlines Benjamin’s explanation of the object as an idol and its purpose historically, and the shift in perception of art post-Renaissance, but then locates the argument in the here and now, specifically on the internet, which he feels is hugely compatible with how he believes aura functions in the digital age:

Indeed, the traditional archives functioned in the following ways: Certain objects (documents, artworks, etc.) were taken out of the material flow, secured, and put under protection. Walter Benjamin famously described the effect of this operation as the loss of aura. Being taken out of the material flow, the object became a copy of itself, contemplated beyond its original inscription in the ‘here and now’ of the material flow. A museum piece is an object minus its (invisible) aura of originality (originality being understood as the original placing of the object in space and time). Digital archiving, on the other hand, ignores the object and preserves its aura. The object itself is absent. What remains is its metadata—the information about the here and now of its original inscription into the material flow: photos, videos, and textual testimonies. The museum object always

needed an interpretation that substituted for its lost aura. Digital metadata creates an aura without an object. That is why the adequate reaction to this metadata is the reenactment of the documented event—an attempt to fill out the emptiness in the middle of the aura (Groys 2016).

Groys believes that by visiting contemporary museum exhibitions, which have become standardised to the Western model, We are confronted with the irreversibility of time; we are aware that these exhibitions are transient and will not be present if we return to the same museum at a later date. Only the documentation will remain, such as a catalogue, a film, or a website. Our perspective, our gaze, is asymmetrical with the gaze of a camera, and these perspectives cannot coincide as they might if an opera or ballet were being recorded. When confronted with the documentation of past artistic events, exhibitions, or performances, we cannot help but experience a certain degree of nostalgia. The nostalgia evoked by a recorded art event makes us desire a re-enactment of the event ‘as it truly was’. He compares the nostalgia for contemporary works of art or events that their documentation evokes to the early Romantic period's nostalgia for nature. Art was seen then as a record of the beautiful or sublime aesthetic experiences offered by being in Nature (Groys 2016).

In her chapter *Notes on Post-Internet Art*, (2014) from the compilation *You Are Here: Art After the Internet*, Jennifer Chan

examines the emergence and characteristics of post-internet art, acknowledging the term "post-internet" as a nebulous and contested concept, often met with scepticism or confusion (Chan 2014). Though it first appeared in Lev Manovich's definitions of post-media aesthetics in 2001, Marisa Olson coined the phrase in 2008 to describe the necessity and impact of the internet on daily life and, subsequently, art practice (Manovich 2001; 14). The post-internet label does not suggest the internet is obsolete; rather, there is a convergence of interests between internet art, post-internet, and the New Aesthetic. These ideas arose simultaneously from the artistic use of the Internet as a popular medium and the materialisation of its fundamental ideas.

New media art is a larger genre encompassing art practices at the intersections of technology that were once considered new—from radio and analogue video to interactive installation and internet art. Internet art (or Net Art) employs the networked, decentralised structure of the Internet as both a medium and an environment. In the 1990s, its early practitioners commonly referred to it as 'net.art'. Post-internet is a term often ascribed to contemporary art and web-based work that appeared online after 2005—digital art that's 'translated' into gallery spaces and informal exhibitions at bars, cafes, nightclubs, and other venues (Quaranta 2008).

In the chapter, Chan is less interested in the aesthetic qualities of post-net art (while net art refers to art that uses the Internet as its

medium and cannot be experienced any other way, Post-Internet Art is a 21st-century art movement involving works that are derived from the Internet or its effects on aesthetics, culture and society) (Wallace 2014) and more interested in “the post-internet condition, which is as much about the existential and ethical dimension of making art online and the creation of surplus value around its effects as it is about the politics and anxieties that exist around so-called post-internet art practices”(Chan 2014 ;106). She argues that post-internet art can be understood as a response to the pervasive presence of digital technology and the internet in contemporary culture, reflecting the ways in which the internet has become an integral part of our lives, influencing our perceptions, behaviours, and artistic practices. Post-internet art embraces the hybridity of mediums and forms, blurring the boundaries between digital and physical realms, and utilises diverse materials and techniques, including digital images, video, sculpture, performance, and installation. The works navigate the fluidity of online and offline spaces, questioning the distinction between the virtual and the ‘real’.

In her essay *The Sameness of Internet Culture*, Sher Tan asks, “As physical and online spaces grow increasingly uniform and indistinguishable, a feedback loop of taste is created. What does it mean when culture and language are informed by the algorithm, fed back into it, and repeated?” (Tan 2019).

In 1995, Marc Augé introduced the term 'non-place' to describe the uniform design of shopping centres, hotels, and airports that emerged due to globalisation Augé believed that non-places would become socially isolating due to their familiarity (Augé 1995, 2009). Kyle Chayka (2016) later coined the term 'Airspace' to describe the 'Airbnb aesthetic' that has influenced the design of various spaces. This aesthetic continues to spread globally, representing a certain lifestyle and sense of 'cool' derived from “minimalism, warm lighting, indoor plants, and exposed brick." Despite being in different locations, individuals can feel familiar in these spaces due to their uniformity.

It follows that Airspace is shorthand for gentrification gone viral. When taste-making is subject to the tastes of those who see themselves as connoisseurs, it goes without saying that some people will get shut out. As Chayka writes, ‘You either belong to the Airspace class or you don’t.’ In a recent interview with BBC Radio 4, he further makes plain the seamlessness of this gentrification-as-virality: ‘If the image of a very stark space with minimalist furniture works very well on Airbnb the internet platform, then the more people who see your house… the more people are going to rent it out… the more popular it will be… the more Airbnb will then promote your house. The aesthetic rewards the people who adopt it, and then even more people adopt it” (Chayka 2016).

Tan proposes that as Western creative workers engage in more travel, their expectations have shifted beyond wanting Airbnbs and coffee shops that resemble those in their home country. They now also desire workspaces that offer a similar aesthetic, and this trend is driven by the increasing appeal of 'digital nomadism' among affluent individuals who are drawn to the opportunities offered by remote work and start-ups facilitated by the internet. As a result, the concept of 'leaving home to be at home' is becoming even more widespread, and transcending borders (Tan 2019). Tan uses the term "spatial apartheid" to describe the gentrification of workspace and its impact on housing opportunities for local residents as digital nomads seek out places to work remotely. Urbanism researcher Sarita Pillay calls this an 'aesthetic of exclusivity' (Laric 2012).

Tan moves on to internet aesthetics, noting that loud websites and customisable pages are now, more often than not, considered kitsch; instead, a stark minimalism appears to reign supreme.

On these interfaces, fonts like Helvetica are used to denote a sense of casual chic, while Garamond gives off an air of professionalism. I'm drafting this essay in Comic Sans but will file it in Times New Roman. Dark-coloured text on light-coloured backgrounds, large images, strong typography Apple's website looks like Forbes' looks like VICE's looks like Monocle's looks like The Cut's looks like Frieze's looks like Medium's. Art and

literary magazines like Granta and Art forum trail the breadcrumbs… When content management systems (CMS) such as WordPress and Squarespace create the template and structure of many modern websites, it seems more practical and cost-efficient to use what is already available. But as Chayka points out, CMSes "increasingly influence not just how stories look but how they are produced, discovered, read, or monetised" (Tan 2019).

Tan questions whether saturating our senses with a particular aesthetic led to the emergence of tastemakers. She says that our desires are inherently imitative; we are attracted to things we see our peers, or aspirational public figures, enjoying or adopting. Walter Benjamin noted that taste is only solidified when the production of commodities surpasses all other forms of production (Benjamin 1935).

As the expertness of the customer declines, the importance of his taste increases proportionately, both for him and the manufacturer. For the consumer, it serves as a more or less elaborate masking of his lack of expertness. For the manufacturer, it serves as a fresh stimulus to consumption (Benjamin 1938).

Tan ends her essay with, “Content and knowledge are not the same thing. When there is no continuity of context, we will keep reinventing the wheel. And the wheel will keep spinning until it glitches out (Tan 2019). This is a telling analogy to computational creativity, the acquisition of content for use by AI systems does not equate with it acquiring “knowledge”.

Computational Creativity

A creative idea must be useful, illuminating, or challenging in some way - (Boden 2004; 41)

Is there a streamlined process for creating, or does it depend on the individual? As we have seen, Miller's definition of creativity is based on the former. The creative process starts with an idea that is put into action using different skills, such as problem-solving, analytical thinking, and lateral thinking. In *The Creative Mind: Myths and Mechanisms* (1990, 2004) Dr. Margaret Bowden, research professor of cognitive science at the University of Sussex, expands on this idea and identifies three separate creative processes: combinational, exploratory, and transformative creativity, additionally proposing three different psychological mechanisms, eliciting different sorts of surprise.

Combinational creativity uses combinations of familiar ideas or processes to create something new. For instance, the iPhone combines the concepts and functionality of a basic computer, digital camera, and mobile phone into one product. The results of such combinations can elicit surprise or even shock (Miller 2019; 56).

Exploratory creativity pushes the boundaries of what a given field is capable of while still using ways of thinking that are conventional within that field, such as new styles, new sentences, and new melodies. For example, today's computer

chips are smaller and faster than five years ago due to incremental advances from exploratory creativity (Miller 2019; 56).

Transformative creativity is the most radical form of creativity because it creates something that was previously not thought to be possible. For example, to create the virtual reality headset, its creators had to challenge the notion that screens must always be viewed from a distance. By constantly altering the angle of view in response to the viewer's motions, viewers have an immersive viewing experience. Boden acknowledges that it may take years for the results of transformational creativity to be recognised as often they can be so outlandish (as in Miller's examples of Einstein and Picasso) as to engender disgust or disbelief (Boden 2016; 69, Miller 2019; 56).

Dean Simonton, professor of psychology at the University of California, studies the sociocultural factors in creativity, and questions Boden's criteria, specifically how many criteria are really necessary. Simonton likens Boden's three criteria "to those of the U.S. Patent Office, namely that to earn patent protection, an invention must be new, useful, and non-obvious" (Simonton, 2017). In *The Creative Mind* Bowden poses what she calls the four Lovelace questions:

1. Can computational concepts help us understand human creativity?

2. Could a computer ever appear to be creative?

3. Can a computer appear to recognise creativity?

4. Could a computer, no matter how impressive its performance, ever *really* be creative?

On the basis of examples from around 1990 when the book was published, including art, poetry and scientific discoveries, she concludes that the answer to the first three is yes, primarily focusing on the first Lovelace question, “Can computational concepts help us understand human creativity?”. She goes on to say questions one to three are empirical and scientific, while the fourth is not scientific but philosophical. In her last chapter, she discusses it from a philosophical perspective, concluding the answer has to be “no” (Miller 2019; 273). If a computer, no matter how impressive its performance, can never really be creative, how can we locate it in the discourse around contemporary art making? I argue that as a conceptual—rather than technical—device, AI at present has been under-utilised.

Speculative Futures

In *Robotics and Art, Computationalism and Embodiment* (2016) Simon Penny examines the intersection of philosophy, art, and robotics and sheds insight on the complex interrelationship between technology and creativity. The book, written by prominent authors, artists and researchers, explores the theoretical and applied elements of robotics and its implications for computationalism, creative expression, and the embodiment

of machines. The first section looks at the philosophical and historical underpinnings of robotics and art, tracing the origins of both disciplines and their intertwined paths. It focuses on the rise of computational methods to creativity while examining the impact of cybernetics, artificial intelligence, and cognitive science on the creation of robotic art. Computationalism, or the idea that computing systems may emulate or reproduce the human mind and its cognitive processes, is one of the primary topics covered in the book (Penny 2016). The writer explores the discourse around this idea, looking at how it affects artistic production and how robots might be viewed as creative agents. He questions whether computers can actually have an aesthetic sensibility and the limits of human creativity.

Penny also explores the idea of embodiment, looking at how physical entities like robots engage with the world around them and communicate with humans. It examines how embodiment affects creative expression and the possibility of robots taking on artistic personas, and explores how robotics might broaden the scope of human creativity by presenting fresh viewpoints and approaches of artistic discovery (Penny 2016). Examples like interactive installations, robotic performances, and autonomous artworks are used to demonstrate the wide diversity of robotic art. By analysing these pieces through the lenses of computationalism and embodiment, Penny sheds light on the creative processes and effects of utilising robots in the arts. The book also explores the ethical and social implications of robots

and art. It highlights concerns about how automation will affect human labour, whether or not computers will be able to take the position of artists, and the moral ramifications of developing autonomous artistic systems. The writers navigate these complicated issues while urging readers to think critically about how robots are affecting both the creative world and society at large. How are these concerns around technology represented through art practice? One aesthetic device is the use of the grotesque and the abject.

Francis Connelly, in *Modern Art and The Grotesque* (2003), identifies three strands of discourse that carried the grotesque into the eighteenth century:

Ornamental: This strand originated with the works of Horace, whose writings were reinterpreted in the Renaissance and again by art academics of the Enlightenment. Horace's *Ars Poetica* (c.19 BC) situates the discussion of images within the expectations of the written word and sees the grotesque as histrionic, ridiculous, and not really worth considering (Connelly 2003; 7). It is worth noting that the grotesque he was referring to was highly decorative rather than that which could be termed caricatures. Sixteenth-century Italian theorists such as the major Elizabethan translators Sir Thomas Hoby, Sir Thomas North, John Florio, and Philemon Holland reinterpreted Horace's dictum as a defence of artistic licence, asserting the artist's right to dare and to integrate play and risk as legitimate parts of the creative

process. Concurrently, artists were exploring the modalities of the grotesque through invention and challenging the boundaries of the Renaissance style.

Carnivalesque: This strand is populist, a bodily grotesque that is overtly transgressive. It originated in folk culture and was appropriated in literary and fine arts traditions in the sixteenth century. Carnivalesque refers to merrymaking illustrated in mediaeval imagery (Stoic hi ţă and Coderch 1999; 15), it transgresses entrenched social codes and values; in this way, it has provocative links to the contemporary notion of the abject as well as strong links to modern caricature.

A sub-strand of the Carnivalesque is *Traumwerk*, which translates from German as ‘dream work’. The term originated in the German style of painting that incorporated mythological and monstrous figures with social comment, reminding the viewer of the ultimate and inevitable failure in death. Albrecht Dürer says of Traumwerk: “Whoever wants to do dream work must mix all things together (Oklot 2009; 147).

Imagistic language: Imagistic language is primitive, emblematic, and mystical. This interpretation took shape just as the rationalist turn of the Enlightenment caused many to reject the use of emblems as well as mythical and allegorical figures. However, social sciences at this time sought to map the origins and development of culture, and mythical hybrids such as combinatory grotesques, such as half-lion, half-bird griffins, as well as emblems and allegories, captured the public imagination.

A popular idea or feeling that feeds directly into notions of imagistic language is the idea of collective history. Early man experimented with form and ideas, creating a visual language that included monsters. As language developed, writing overtook these physical forms but was subsumed into what Jung would define as a “collective unconscious” (Jung and Hull 1981). The possibility of an ‘invisible’ or ‘pictorial’ language was influential for modern writers and artists. Text became the principal vehicle for abstract thought, and the combinatory and metamorphic grotesques that made up the poetic monsters were relegated to subservient roles.

In *Bodies and Digital Utopia* (2000) Catherine Bernard says that the way we relate to our physical and social bodies today betrays a deep unease in our culture that is brought on by redefining what it means to be physically identifiable, growing media adulation, obsession with violence, the belief that one is invincible, recurring themes of the survival of the fittest in films and television, as well as sensational news stories about genetic engineering and the control of human longevity, health, appearance, and reproduction. Guy Debord made the now-famous forecasts in the late 1960s about a reality that would be turned into a variety of shows, and they have come to pass. We now perceive the physical world as a soap opera with logo-specific design and commercial breaks as a result of broadcasting technology's ongoing and enormous effect. Thus, the disassociation from the perception of physical reality is

increased when communication networks, such as texts, social media alerts, and email, become deeply embedded in our daily life. With the promise of an open space of equal exchange based on a non-hierarchical structure on the one hand, and the creation of a global network and space without physical boundaries opposing unilateral systems of information by de facto opening transnational and transcultural connections on the other, digital communications promote an ideology of transcendence in regard to the plurality and diversity of cultures, politics, and histories that overcome space and time.

The final section shows how postmodern transnational pan-capitalism has replaced the hegemony of national economic and cultural interests that constitute modern capitalism. Pan-capitalism functions better when it assumes a universal identity, for which difference is beneficial as long as it gives fresh marketing ideas transmitted via the internet. Consider the startling statistics that define the digital divide: fewer than 5% of the world's population is already online, despite the fact that electronic commerce is booming and that more than 15 billion websites now pack the internet.

In the following chapters I will more closely examine the key themes raised by the texts discussed, specifically in the context of contemporary art practices.

Chapter One: Creativity

Artwork 1: *Zephyr Nova*

Design

In our era, one that increasingly views the world through the mediation of digital technology, questions surrounding authenticity, authorship, and the blurred boundaries between reality and artifice have become ever more pertinent. This research navigates this complex terrain, challenging notions of creativity, authorship, and the essence of artistic identity through the creation of a fictional artist persona and website.

Contemporary art, since the advent of Postmodernism in the mid-twentieth century, has commonly critiqued the historical notion that an artwork must be understood in the context of the biography of the artist. For example, many art museums present the Dutch painter Vincent Van Gogh by focusing on his tragic personal life and ultimate suicide. Thus, the audience's interpretation of his work is framed by the dominance of a biographical narrative. A post-structuralist critique that influenced early postmodernism is elicited in Roland Barthes' seminal essay *The Death of the Author* (Barthes 1967; 148) where he argues that "a text's unity lies not in its origin but in its destination" and that "the birth of the reader must be at the cost of the death of the Author"(Barthes 1967; 148). Though Barthes was referring to written text (i.e. author/reader), this idea was quickly picked up by visual artists who began exploring the implications of his ideas. Though many examples abound, I will focus on

Typologies, a series begun by Bernd and Hilla Becher in the early 1960's that ended in 2009, to demonstrate this point. By cataloguing industrial architecture in an impersonal and encyclopaedic fashion, the work leaves the viewer to interpret the significance of these collections of photographs. The images are framed and printed to look the same, giving the work the appearance of automation or as if the work was a purely technical exercise, similar to a contemporary dataset. This schism between the artwork produced and the personality of the artist is a conceptual methodology employed to offset the prevailing culture in the art museums of the early 1970's.



Fig 1.1: Bernd and Hilla Becher. *Petrochemical Plant, Wesseling, GER*, 1992, Selection from the larger *Typologies* works, Black and white photograph 60 x 50 cm 91,5 x 75 cm (framed) Copyright Bernd Hilla Becher Courtesy Sprüth Magers

As noted by Diarmuid Costello and Margaret Iversen in a volume discussing *Agency and Automatism: Photography as Art Since the Sixties* in the *University of Chicago Journal of Critical Inquiry* (2012), artists working in this way demonstrate a desire to challenge the notion that the significance of artwork is contingent on a cult of personality surrounding the artist as an individual. Also that by using a process that suggests a mechanised process rather than personal, tactile interaction, they question the requirement that the presence of the author qualifies the work (Costello and Iversen 2012).

This biographical framing of the artist as a genius, around whom a cult of personality can be assembled, was most visible in recent years in the work of multimedia artist Marina Abromović. The performance work *The Artist is Present* (2010) saw the artist engage directly with members of the public for three months by sitting in the gallery of the Museum of Modern Art in New York every day for eight hours. The context for the performance was a major retrospective of the artist's work being held at the same time. Arguably the work could be considered to be a demystification of the role of the artist by means of proximity. However, a critic such as Marcia Vetrocq notes in Art in America that "there … existed an intimate, vital connection between each performance and this artist's own history and being" (Vetrocq 2010) and that this can lead to the portrayal of Abromović in messianic terms.

Implementation

This research involved the creation of a fictitious artist persona, utilising AI-generated text and images, and collaborating with artificial intelligence to fabricate artworks (for the full conversation, see Appendix 1.1). The project aimd to investigate the potential of AI in generating creative content and its implications for contemporary art practice.

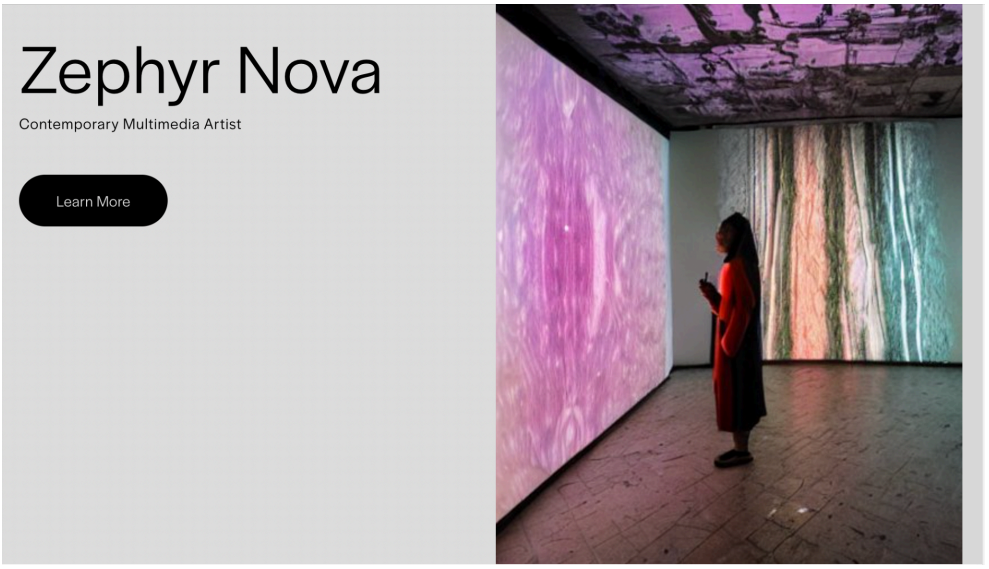


Fig 1.2: Catherine Bourne, *Zephyr Nova Website*, 2023, Screenshot

The creative process began by prompting AI to engage in an artistic dialogue. ChatGPT was tasked with devising a set of questions constituting a rudimentary Art-Turing Test, a benchmark inspired by the traditional Turing Test for evaluating artificial intelligence (Risam, R., 2018, p.39).

The AI was then asked to answer these questions, which it initially refused. Subsequently, the AI was prompted to respond

as a fictional contemporary multimedia artist, thus embarking on the creation of the artist persona. The questions posed to ChatGPT included:

1. Can you describe your creative process?

2. How do you come up with new ideas for your art?

3. Can you explain the meaning behind a particular piece of art you have created?

4. What emotions or feelings do you hope to convey through your art?

5. Can you talk about how your art has evolved over time?

6. How do you decide when a piece of art is finished?

7. Can you tell us about an artistic collaboration you have participated in and how it influenced your work?

8. How do you respond to criticism or feedback on your art?

9. Can you discuss how you use different techniques or mediums in your art to achieve certain effects?

10. Can you tell us about a time when you felt particularly inspired or moved to create art?

ChatGPT responded to these questions once in its fictional role, eagerly describing the creative process, generating new ideas, explaining the meaning behind specific pieces of art, discussing the intended emotions and feelings conveyed through art, the

evolution of art over time, deciding when a piece of art is finished, artistic collaborations, and responses to criticism and feedback. These text responses formed the foundation of an entirely fabricated artist identity and their body of work, a conceptual construct.

Following this, Midjourney was used to visually fabricate artworks based on the text descriptions provided by ChatGPT. I requested that ChatGPT devise a name for the artist, it selected “Zephyr Nova” and to fabricate an Arts magazine and interview with the artist. This material was then collated into a fictional artist website.



Fig 1.3: Catherine Bourne. *Zephyr Nova Website*, 2023, Screenshot

Analysis

This experiment highlights the limitations and aesthetic biases inherent in AI-generated content, allowing for various analyses. ChatGPT's conception of an artist is derived from its training on specific datasets, primarily professional artist websites that

represent artistic successes rather than failures. My own biases are evident in the initial prompt, specifically requesting a contemporary multimedia artist, thus creating a feedback loop of text and image generation.

By adding these layers of complexity, or process, beyond the initial prompt we question whether this constitutes more complex AI art than pure prompted image generation. It raises the issue of a feedback loop where AI creates material based on AI-generated material, media representing itself. It is worth noting that the ironic intent, mocking the pretentious language of much contemporary art, may be lost in a purely digital context and requires the author's explanation to be fully understood.

The artistic representations created are arguably outdated, such as utilising plinths and semi-abstract imagery, which are clichéd representations. These works lack depth, and substance, merely approximating contemporary art without fully realising it. There is also a clear demographic bias in the outcomes, with the resulting persona being female and European, reflecting the dominant cultural norms in the arts represented online. This underscores a cultural commentary on the state of the arts, as the AI's outputs reflect the biases inherent in the datasets it was trained on.

To expand the analysis of my project, several additional aspects warrant consideration. First, the ethical implications of biases in AI-generated art are significant. The AI's training data, which predominantly represents Western art and artists, leads to a narrow representation of artistic styles and subjects (Choi, DiPaola, and Töyrylä 2021). This highlights the importance of diverse datasets to mitigate these biases and promote inclusivity in AI-generated art. Moreover, intellectual property issues arise, questions about who owns the rights to the art—whether it is the artist who prompted the AI, the AI itself, or the developers of the AI—challenge traditional definitions of intellectual property and ownership in the digital age.

Philosophically, AI challenges traditional notions of creativity. If creativity is defined as the ability to generate novel and valuable ideas, can AI be considered truly creative, or is it merely a tool that extends human creativity? This distinction has profound implications for the art world. Furthermore, it reiterates that the potential for human-AI collaboration to enhance creative processes is worth exploring in this research. Artists can leverage AI as a partner rather than just a tool, producing unique outcomes that neither could achieve alone. This evolution also has implications for art education. Art schools must adapt their curricula to prepare future artists for a landscape where AI plays a significant role, emphasising the skills and knowledge necessary for this new environment.

The cultural impact of AI-generated art is also critical. Public perception of AI art is influenced by factors such as the novelty of the technology, concerns about authenticity, and potential devaluation of human creativity. AI-generated art can serve as a commentary on contemporary culture, highlighting societal issues like the influence of technology on human life, the role of algorithms in shaping culture, and the nature of creativity in the digital age. Methodologically, the approaches used in my experiment provide valuable context. This includes the selection of AI tools, the design of prompts, and the criteria for evaluating the AI-generated artworks, as well as the final portfolio (website) as a whole.

Artist Sophie Calle's work, known for its conceptual and autobiographical elements, offers a relevant parallel to my exploration of AI-generated art. Calle's practice often involves a deep investigation of identity, surveillance, and the boundaries between public and private life, themes that resonate with the process of creating a fictitious artist persona using AI. For instance, in her seminal work *Suite Vénitienne* (1980), Calle followed a stranger through Venice, documenting her observations and interactions. This project blurs the line between reality and fiction, much like my experiment with AI-generated art, where the boundary between human and machine creativity is tested.



Fig 1.4: Sofe Calle, *Suite Vénitienne*, 1980, Silver Gelatin Photography

Calle's use of narrative and documentation as artistic tools parallels the methodological approach of my project. By asking ChatGPT to answer questions as a fictional contemporary multimedia artist, I created a narrative that serves as both a conceptual framework and an artwork in itself. This mirrors Calle's practice of constructing elaborate narratives that question the nature of truth and fiction. The AI-generated responses and subsequent artworks form a layered narrative that challenges traditional notions of authorship and originality, concepts central to Calle's work. Her work often delves into personal and intimate experiences, inviting viewers to question their own perceptions and emotions. It is quirky and idiosyncratic, driven by the obsessions of the artist and interested in how our perception can be incomplete and flawed. Calle's emphasis on process over

final product (Calle 2023) is also relevant to my research. Her projects are often ongoing, evolving over time and involving various stages of creation, much like the iterative process of prompting AI and refining and/or reimagining the outputs. Moreover, Calle's work often includes an element of irony and critique of contemporary art practices, which is also present in my project. The 'joke' of creating a pretentious but generic fictional artist persona using AI is a satirical commentary on the art world's tendencies towards elitism and superficiality. This critique is embedded in the very fabric of the project, much like Calle's subtle yet powerful criticisms of social norms and expectations.

Another work that parallels my own investigations is Ai Weiwei's *Ai vs AI* (2024), wherein the artist undertook a process of questioning AI on various topics. The material exhibition outcomes were screen based, with the 81 questions appearing on screens in London, Seoul, Milan, Lagos, Accra, Nairobi, Abidjan, and Berlin over twelve weeks. The questions were partly self-authored, and partly gathered from friends and collaborators:

Ai vs AI - AN 81-DAY QUEST FOR ENLIGHTENMENT

In our questions, more so than any answers, we can find the map of the human mind. We ask questions in search of learning and understanding, says Ai Weiwei, dividing ourselves from

systems of Artificial Intelligence (AI) that lack interior identities. The questions we ask reveal our humanity and preoccupations, further distancing the human questioner from machine systems, which have no life story, no personhood from which any sincere question can arise. Ai Weiwei's 81 questions are both the continuation of a deep history of rational and spiritual inquiry as well as an innately idiosyncratic autoportrait. Ai vs AI is both an endeavour to reinvigorate the ancient convention of philosophical dialogues (from Socrates to The Enlightenment Salon) and a hand-drawn map of Ai's own mind. Taking inspiration from both the Tiānwèn ('The Heavenly Questions') and Ai's 81-day imprisonment [by the Chinese government in 2011]*, he explores how the act of questioning retains power today… "Questions are important because they relate to our personal stories." For all humans – from newly inquisitive children to longest-lived adults – the one capacity and freedom we retain is the question, says Ai… Questions are, in themselves, generative: in asking, we sketch out a terrain vague of human inquiry: for thousands of years, Chinese poets and thinkers asked what we might find walking on the surface of the moon, says Ai – this unknown fueling creativity and generating poetry and song. For this fertile landscape of imagination, the arrival of astronauts on the moon and the photography of dusty craters delivered by lunar exploration marked the destruction of creative terrain. "Expression has always been structured by words and by forms – as fairy tales and mythology," says Ai. "We have to give a symbolic character to any expression." Still, rising systems of*

technology and knowledge production present new challenges to our ability to question the world. In an age of rising artificial intelligence – when humanity's role in many forms of knowledge labour is reduced to asking the right questions to powerful systems of information processing – we are reminded that questions are far more than a means to an end, says AI. "If humans will ever be liberated, it will be because we ask the right questions, not provide the right answers."

Weiwei is not ascribing intelligence to AI, but rather highlighting its potential to be used for tyrannical ends. By engaging in a conversation about the inherent limitations of the technology itself, he is exploring ways of expanding the discourse around this technology using subversive means, and it is this aspect that is relevant to my research. While I used irony and playful experimentation within this initial experiment, by deliberately blurring the lines between reality and fabrication, I seek to raise critical questions about the role of AI in the artistic domain, and the evolving notion of artistic identity in the age of technological advancements. By inviting audiences to navigate the intricate web of truth and fabrication, I aim to spark a deeper understanding of the complex interplay between technology, art, and the fluid nature of human expression.

Creativity: Discussion

Creativity is allowing oneself to make mistakes. Art is knowing which ones to keep — Scott Adams (1996)

The role of an artist in the 21st century is characterised by a diverse array of practices, methodologies, and artistic mediums within an increasingly interconnected global framework. The conventional characterisation of an artist as an individual engaged in the production of visual or fine art has undergone an expansion to encompass diverse modes of expression and interdisciplinary methodologies. Contemporary artists are afforded an extensive array of tools and technologies that were previously inaccessible. Digital art, video art, interactive installations, virtual reality, and augmented reality represent a selection of contemporary mediums that artists can employ to effectively convey their concepts and actively involve their viewers. Hybrid forms of expression can be created through the integration of various components such as visual art, performance, technology, science, and creative social engagement. The utilisation of an interdisciplinary approach facilitates the creation of innovative endeavours that question and push the boundaries of traditional art definitions. However, I would argue that an emphasis on cross-disciplinary practice, within arts education and the broader discourse, can lead to the minimisation of the specialisation of media.

Artists frequently employ their artistic creations as a medium for expressing their perspectives on societal, political, and ecological matters. They delve into the intricate connection between technology and the human condition, tackling subjects such as artificial intelligence, virtual personas, data representation, and the ramifications of technology on the collective. These artistic practices and interpretations are significantly influenced by contextual factors, including social, cultural, and historical backgrounds. We have become accustomed to the idea of novelty, and uniqueness. The Modernists especially suggested that every artist had to be completely unique and this is reflected in the practices of artists today (Sturken and Cartwright 2009; 328). It must be noted that we are transitioning into a technocratic society, so individuals who have never interacted with creativity can mimic it by interacting with objects that give them an experience that is similar to creativity, but without having to exert the effort and make the creative choices necessary to direct it. This directly feeds into the discourse around AI art, wherein art and critical theory material created by authors and researchers with a purely technical research focus (such as Computer Science) are being uncritically disseminated.

In the following chapter, I will look at the conundrum that exists between the twin concepts of ‘beauty’ and ‘uniqueness’ in the value placed on artworks. Interestingly, in the contemplation of this set of values, there is still evidence of parallel differences between the East and the West (Kwang, 2001; Runco, 2001,

2004), resulting in a very Westernised view of, and research into, computational creativity. Today, these values are more frequently explained in terms of collectivism and individuality, but lead to the same conclusions: “the East tends to marginalise creativity while the West gives people the choice to do so” (Runco, 2001).

Chapter Two: Originality and Reproduction

Artwork 2: Disasters of AI

Design

When I undertook my MFA in 2013, exploring depictions of the grotesque body in contemporary art, I had little idea of the technological possibilities that would be available for creative use ten years later. With this experimental work, I was interested in testing the technical limits of both AI artwork generation, and digital fabrication technology.

I selected the artist Francisco de Goya and his folio of etchings *Desastres de la Guerra* (*Disasters of War*), made during 1810-1820, specifically because of the extensive amount of imagery of his work available online as a data set for AI learning, and also because of the depiction of grotesque bodies in the work.

Goya is widely recognised as a highly influential artist who worked during the latter part of the 18th century and the early years of the 19th century. His artistic trajectory spanned six decades, encompassing a diverse range of techniques and subjects. He was born in the year 1746, in the town of Fuendetodos, Spain. During the initial phase of his artistic career, Goya primarily engaged in court painting, wherein he dedicated

his efforts to portraying the Spanish aristocracy and royal family through portraiture. His portraits were distinguished by a meticulous focus on detail, and a talent for encapsulating the individuality and introspective essence of his sitters. Nevertheless, as Goya's artistic trajectory advanced, his oeuvre acquired a heightened level of introspection. Goya initiated a series of explorations involving various artistic styles and techniques, leading to an expansion of his subject matter to encompass a diverse array of themes including social commentary, political satire, and the depiction of the atrocities associated with warfare. Goya's artistic oeuvre progressively assumed a sombre and introspective character, mirroring his personal disillusionment with the tumultuous political and social milieu of Spain throughout his lifespan.

Desastres de la Guerra (Disasters of War) depicts the atrocities and suffering caused by the Napoleonic Wars and the subsequent Spanish War of Independence. Disasters of War is a modern masterpiece, a work left by its creator as his final bequest to the 19th, 20th, and 21st centuries—it was far too anti-clerical and unpatriotic to be published in his lifetime, and the first edition appeared in 1863, more than three and a half decades after his death in 1828. “Since the very beginning of its public existence, it has been perceived not as a historic but as a contemporary work, its images being so urgent and authentic as to function as living, new art” (Jones 2003). It stands as a testament to his deep empathy for the human condition and his

ability to convey the horrors of war through art. Goya marked the shift from the grotesque as a proscribed expression of evil to a motif used to illustrate specific social and political meanings.

His aesthetic legacy can be seen in the works of contemporary British artists Jake and Dinos Chapman. In 1994 they reproduced one of his horrific images of cruelty as a lifesize tableau featuring a dismembered mannequin impaled on a tree and titled it *Great Deeds Against the Dead*, directly quoting Goya.



Fig 2.0: Jake and Dinos Chapman, *Insult to Injury,* 2003, Mixed media

The Chapmans proceeded to acquire a folio of *Disasters of War* prints, printed in 1937. The collection consisted of a pristine set of 80 etchings that were printed directly from the artist's plates. According to Dinos Chapman, the folio remained in their possession for a span of two years, during which they periodically examined it until reaching a decision regarding their intended course of artistic action: alterations were made to the heads of the depicted victims, which were replaced with heads of clowns and puppies. The newly created piece of art was given the title *Insult to Injury* (Jones 2003). According to Jake Chapman, this process embodies the expressionistic struggle of the Enlightenment against the ancién regime.

Implementation

The Romantic period saw the entrance of the grotesque into the mainstream of modern language as a means to explore alternative modes of classical beauty (Connelly 2003). Francisco Goya's etchings lampooning what he saw as wilful ignorance by the populace, religious fraud, outrageous superstitions, and the hypocrisy of the powerful and wealthy classes. Goya embraced grotesque imagistic language through the use of para-humans as well as metaphor as a means of biting satire: human-like donkeys representing those he perceived to be ignorant or complicit, hideous hags to indicate "witches" (Stoichi ţă and Coderch 1999) or the various classes of women Goya held in disdain, as well as other dream-like apparitions.



Fig 2.1: Francisco José de Goya y Lucientes (1814-1820). *Strange Devotion (Extraña devoción!)*, Etching and aquatint, Plate 66 from the series Desastres de la Guerra (Disasters of War), published 1906



Fig 2.2: Francisco José de Goya y Lucientes (1814-1820). *What Courage! (Que valor!)* Etching and aquatint, Plate 7 from the series Desastres de la Guerra (Disasters of War), 1810-1814, published 1863



Fig 2.3 : Francisco José de Goya y Lucientes (1814-1820). *And They Are Like Wild Beasts (Y son fieras)*, Etching and aquatint, Plate 5 from the series Desastres de la Guerra (Disasters of War), 1810-1814, published 1863



Fig 2.4: Francisco José de Goya y Lucientes (1814-1820). *Perhaps They Are of Another Breed (Si Son de Otro Linage)* Etching and aquatint, Plate 61 from the series Desastres de la Guerra (Disasters of War), 1812-1814, published 1863



Fig 2.5: Francisco José de Goya y Lucientes (1810-1814). *A Heroic Feat! With Dead Men! (Grande hazaña! Con muertos!)*, Etching and aquatint, Plate 39 from the series Desastres de la Guerra (Disasters of War), published 1863

The etchings from the series that I selected for this studio-based research were *Strange Devotion (Extraña devoción!)*, *What Courage! (Que valor!)*, *And They Are Like Wild Beasts (Y son fieras)*, *Perhaps They Are of Another Breed (Si Son de Otro Linage)*, and *A Heroic Feat! With Dead Men! (Grande hazaña! Con muertos!)* and *The Sleep of Reason Produces Monsters (El sueño de la razon produce monstruos)*. I used the English translations of these owing to the prevalence of English on the Midjourney platform, and the English analysis and dissemination of Goya's work online.

The chosen approach involved the selection of specific prompts within the MidJourney platform, with the intention of instructing the AI to generate artworks inspired by the *Disasters of War* series with 16 images generated for each of the Goya etchings. This process resulted in the creation of a dataset consisting of AI-generated images, which were analysed and specific features

identified as representative of Ai figurative glitches, such as soldiers with horse legs, or historically inaccurate aeroplanes. I then collaged elements from the 16 images of each Goya work to create one new digital image to represent the original. From here, I digitally laser-cut eco-lino plates. Experimenting with settings on the laser cutter, I experimented with the digital fabrication programme's setting to adjust each image for the highest contrast and detail. Once the plates were cut, I printed the images on Fabriano paper using black printing ink as the material outcomes of the project sought a restoration of Goya's original materiality, while the conceptual objective is to recreate Goya's artwork by utilising AI technology as a medium.

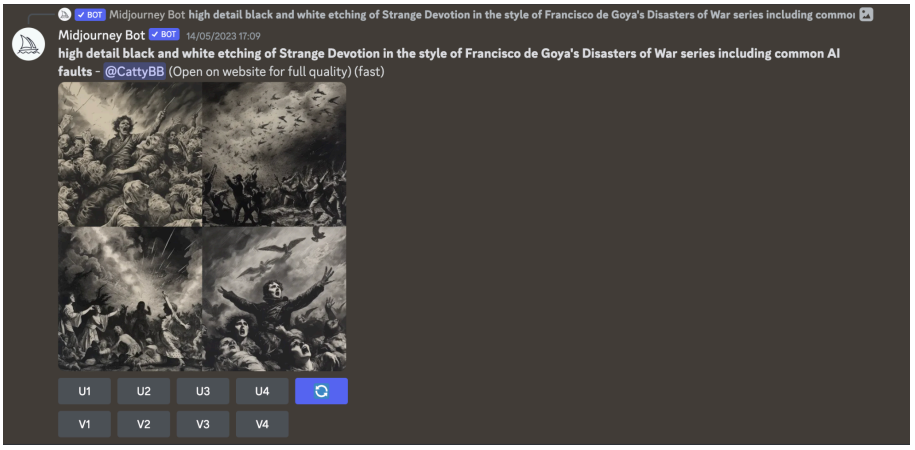


Fig 2.6: Screenshot of Midjourney rendering *Prompt: high detail black and white etching in the style of Francisco de Goya's Disasters of war Series including common AI faults*

I created 16 versions of each image from identical prompts. I used these to "train" myself from off the AI to recreate new collaged images:



Fig 2.9: Catherine Bourne, *A Heroic Feat! With Dead Men! (Grande hazaña! Con muertos!),* 2023, Digital Collage



Fig 2.10: Catherine Bourne, *And They Are Like Wild Beasts (Y son fieras)*, 2023, Digital Collage



Fig 2.11: Catherine Bourne, *Perhaps They Are of Another Breed (Si Son de Otro Linage)*, 2023, Digital Collage



Fig 2.12: Catherine Bourne, *Strange Devotion (Extraña devoción!)*, 2023, Digital Collage

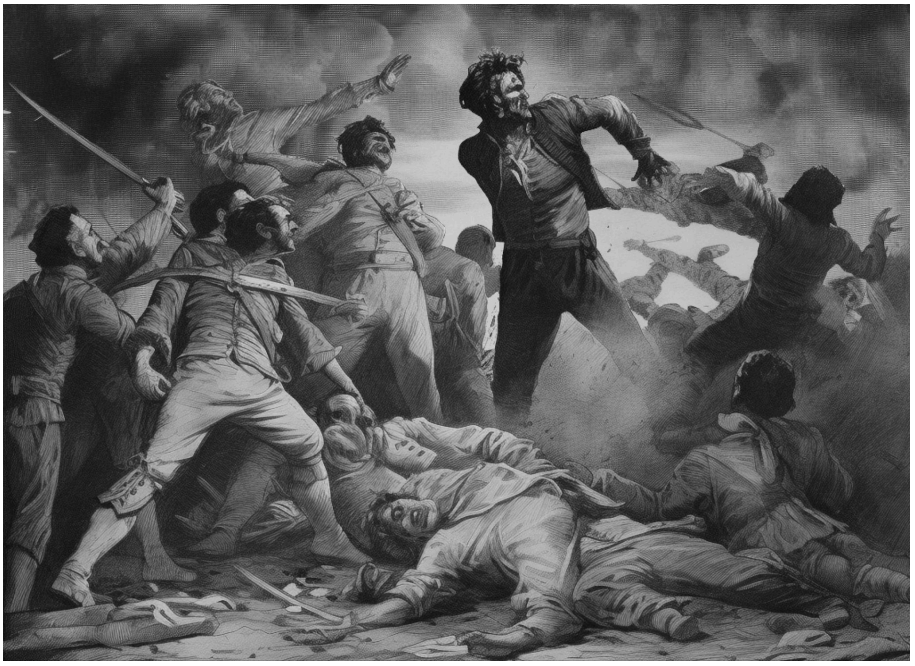


Fig 2.13: Catherine Bourne, *What Courage! (Que valor!)*, 2023, Digital Collage



Fig 2.14: Catherine Bourne, Test 1 of *What Courage! (Que valor!)*, 2023

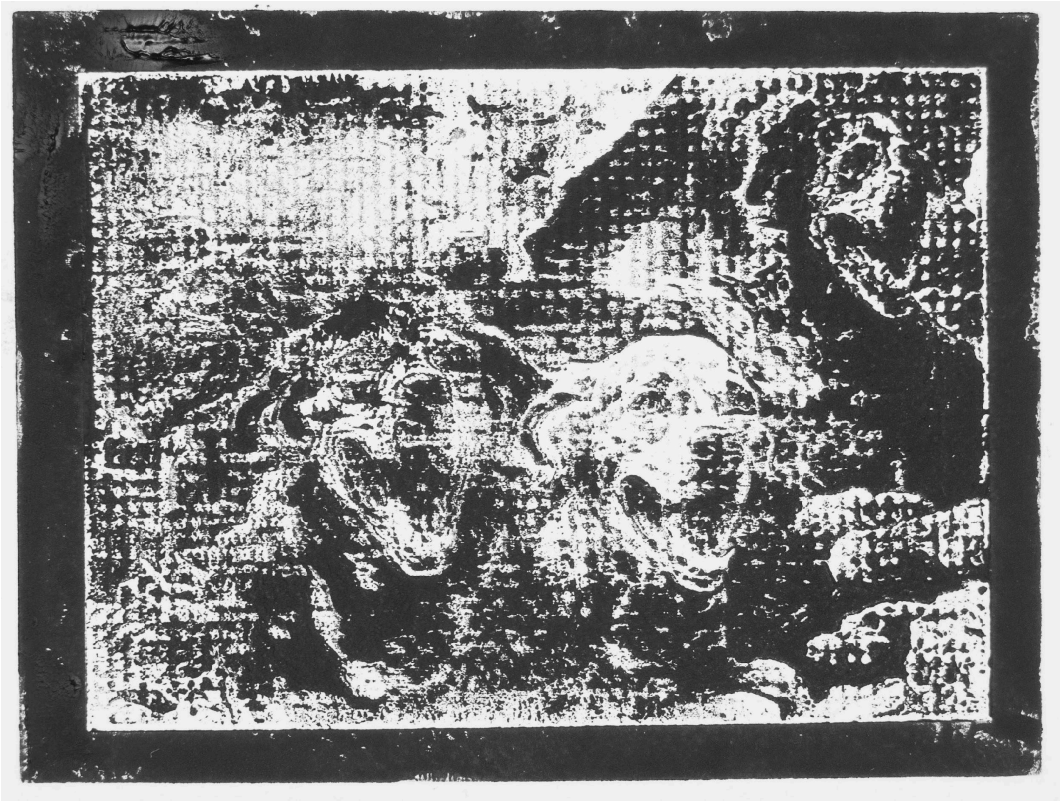


Fig 2.15: Catherine Bourne, *And They Are Like Wild Beasts (Y son fieras)*, 2023, Lino Print

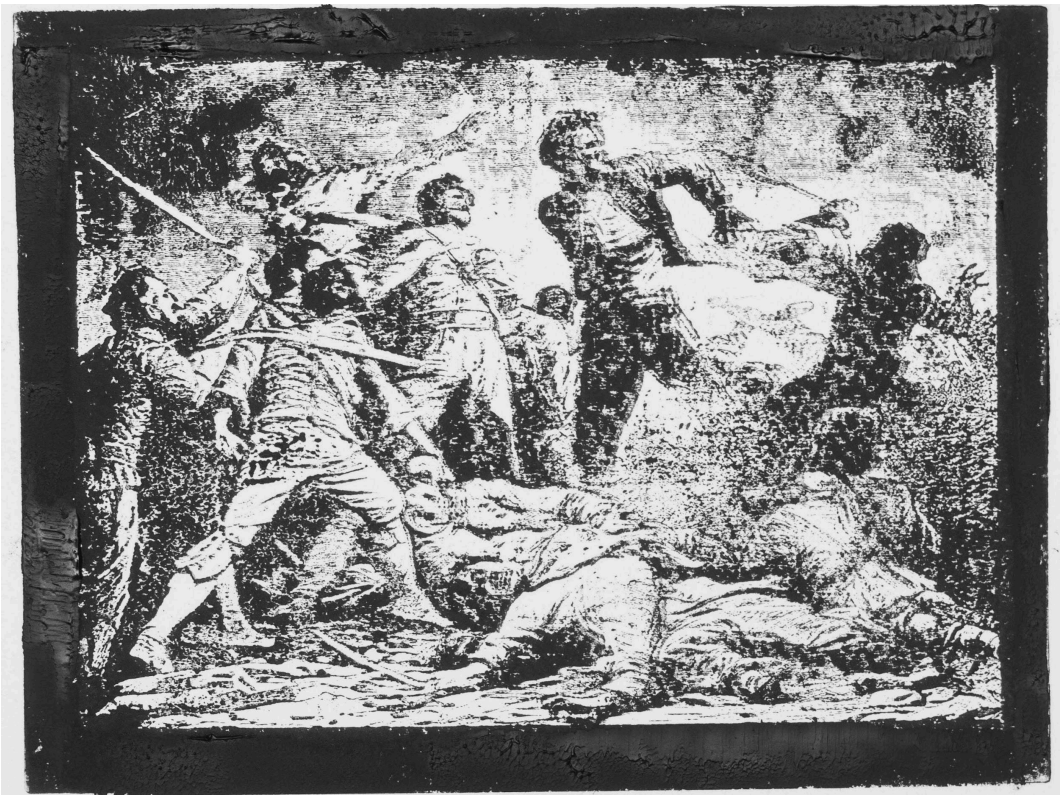


Fig 2.16: Catherine Bourne, *A Heroic Feat! With Dead Men! (Grande hazaña! Con muertos!),* 2023, Lino Print

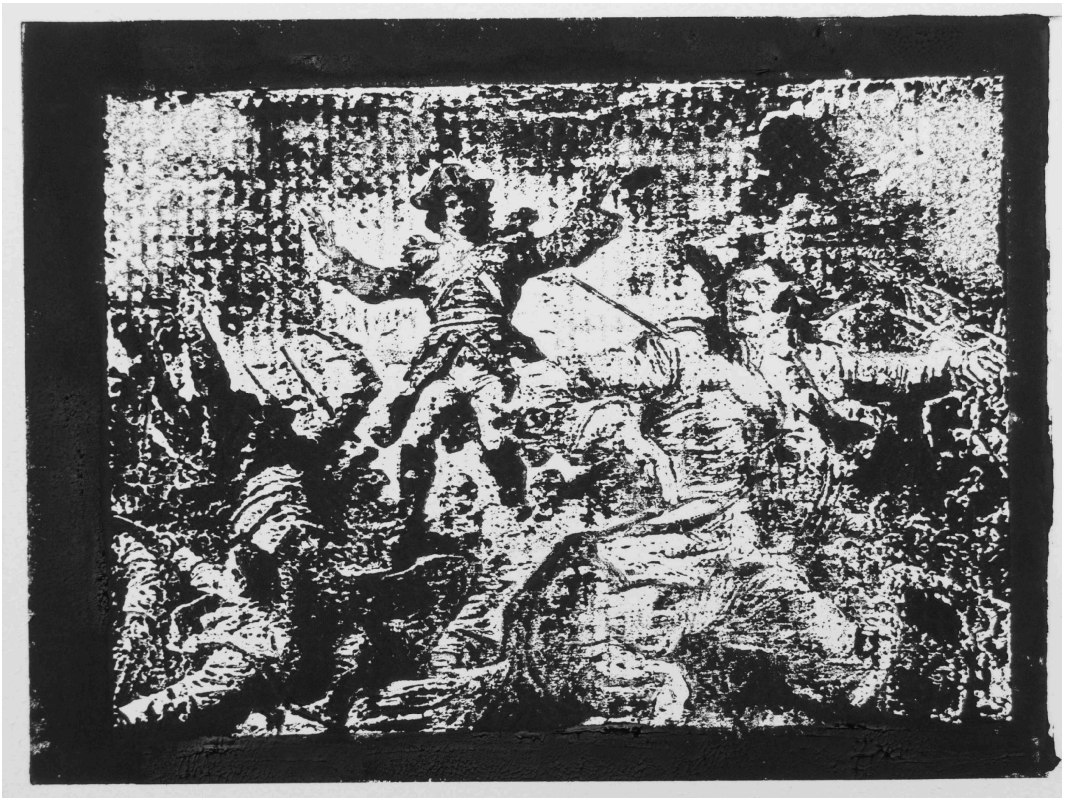


Fig 2.17: Catherine Bourne, *Perhaps They Are of Another Breed (Si Son de Otro Linage)*, 2023, Lino Print

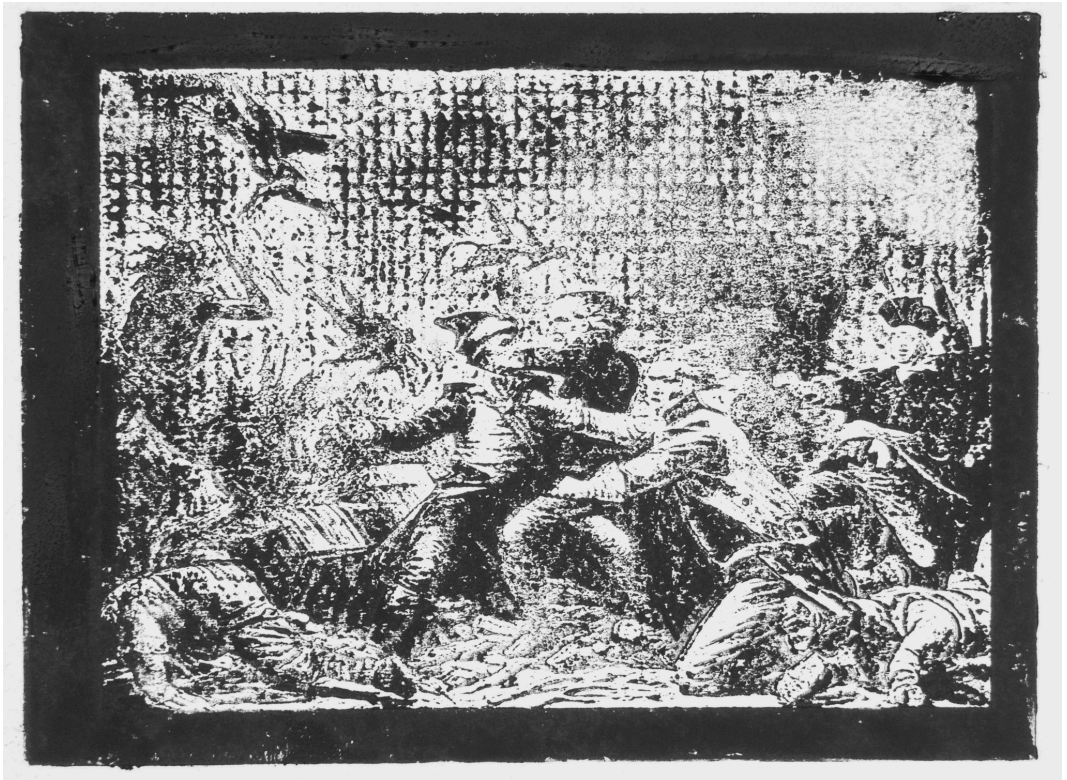


Fig 2.18: Catherine Bourne, *What Courage! (Que valor!)*, 2023, Lino Print



Fig 2.19: Catherine Bourne, *Strange Devotion (Extraña devoción!)*, 2023, Lino Print

Once completed, I titled the print series *Disasters of AI* in reference to the original works while highlighting the failure in both figurative representation, and detail in printing outcomes, inherent in the technology used.

Analysis

Aesthetically, the digital images evoke the photomontage style, which throughout the 20th century was frequently employed as a powerful tool for voicing political resistance. In 1910's, the Dadaists utilised this method as a form of protest during the First World War. The Surrealists then took this concept and harnessed

its potential by merging unrelated images through free association, thus mirroring the workings of the human subconscious.

Pastiche is a term used to describe a culture of invitation, remake, and parody that involves imitating and combining elements from other sources. According to film theorist Richard Dyer, pastiche is an imitation that announces itself as such and combines different elements from various sources (Dyer 2007). The term is derived from the Italian word *pasticcio*, which evokes assemblage, collage, montage, capriccio, medley forms, and hip-hop forms of sampling, scratching, and riffing (Sturken and Cartwright 2009). Pastiche has a long history in image making and involves different types of relationships with the original text, from ironic quoting to parody to remakes to mashups. It often involves pilfering from history and combining historical elements in ways that are not historically meaningful but rather playful.

The strategy of pastiche involves questioning the legitimacy of the original work, which can lead to legal complications when determining ownership of appropriated fragments. Artist Sherry Levine's work in the 1980s exemplifies this postmodern approach, as she rephotographed famous images in violation of copyright and displayed them as her own. Her work disrupts the history of male nudes by appropriating Edward Weston's *Torso of Neil* and presenting it explicitly as a copy, while also critiquing the notion of the male artist as master and the value placed on

originality in the art world. This raises questions about the role of the artist as the sole creator and the significance of the original in a world of reproducibility, complicating the notion of the referent and the identification of the original object.

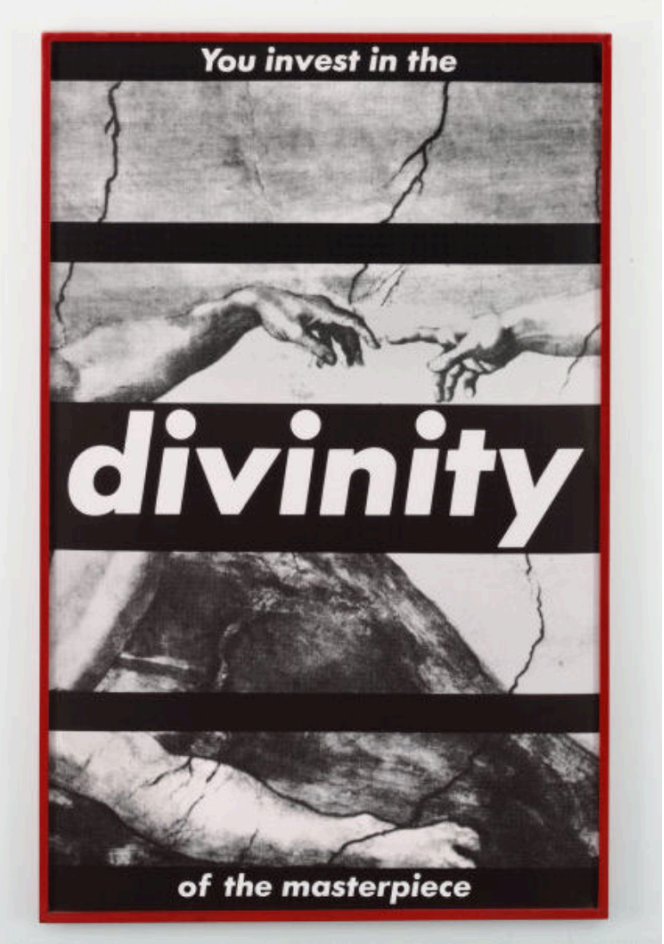


Fig 2.20: Barbara Kruger, *Untitled (You Invest in the Divinity of the Masterpiece),* 1982, Silver Gelatin Print

Barbara Kruger's 1982 artwork, titled *Untitled (You Invest in the Divinity of the Masterpiece)* was produced utilising a photostat machine. This particular device, an early iteration of a projection photocopier, emerged during the 1900s and is the same technological apparatus that Benjamin examines in his discourse. Kruger engaged in the act of appropriation by incorporating a widely recognised excerpt from Michelangelo's

frescoes on the ceiling of the Sistine Chapel. This particular element depicts the moment of the creation of man, wherein God's finger makes contact with Adam's. By juxtaposing a monochromatic rendition of this artwork alongside textual elements, the artist establishes a correlation between the narrative of the Biblical creation account and a renowned exemplar of Western artistry. The influence of Kruger's graphic design background is apparent in her deliberate juxtaposition of the clipped image and assertive textual elements. Through the utilisation of the second-person pronoun "You" Kruger effectively implicates the viewer in the ongoing narratives surrounding religion and art history.

The difference between traditional pastiche strategies and my own with this work is that I am questioning the legitimacy of AI as a creator, and digital technology as a fabrication tool. By intentionally selecting and highlighting elements of the AI-generated dataset that contain stereotypical glitches or mistakes made by AI in my digital collages I am emphasising AI's failure of 'understanding' in the creation of the data inspired by Goya's series. Furthermore, my material outcomes highlight not only the absence of aesthetic understanding in AI creations but also the social context of a linear history of print outcomes being used as a political device.

Traditional etching and laser-cut digital etching create pictures or designs on metal or other surfaces. The methods differ

significantly. Traditional etching creates images on surfaces using chemicals and physical methods. An etching needle is used to sketch or etch the design into the acid-resistant ground. An acid bath etches the exposed regions, forming grooves for printing. Digital etching with a laser cutter engraves or cuts the pattern without chemicals. Laser-cutters can engrave complicated patterns, although their precision is far less than traditional processes. When using digital files, laser cutter digital etching streamlines productivity, software can quickly develop digital designs and send them to the laser cutter for engraving. This simplifies replication and design changes as traditional etching requires plate preparation, design drawing or etching, and printing in order to ‘edit’ the original image if desired.

Reproducing traditional etchings requires effort and skill, such as inking and printing the plates by hand, the reproduction of Goya’s style involved a significant amount of testing of the inking and printing process. Despite extensive testing, and utilising a professional etching press, the material outcomes are poor. The plates are embedded with a grid-like pattern from the lasercutter’s etching process.

The intense detail in the original digital collages is not able to be rendered correctly by the laser etching process owing to the programme’s depth perception capabilities. Where a human artist would have the skill to etch the lino plate deeply in areas of graduation, the programme renders these areas with shallow

‘cuts’. This raises interesting questions about current prosumer-grade digital fabrication. While the process of utilising AI-rendered images as a device for pastiche and collage was successful, the technical implementation using current digital fabrication technology failed to render a result even close to human-made material outcomes. However, this in itself created an interesting outcome that speaks to an obviousness of digital in artworks. This in itself is interesting and, combined with a slight offset ‘shift’ in the print, strongly references glitch art outcomes, as well as Pop Art such as Andy Warhol’s prints.

Photographer Boris Eldagsen made headlines in 2023 after refusing a prestigious award at the Sony World Photography Awards after admitting to being a “cheeky monkey” and generating the prize-winning image using artificial intelligence (Grierson 2023). The winning photograph depicted two women from different generations in black and white, the older one behind with her hands, weathered to the point of being misshapen, on the younger woman’s shoulders. It may be a wedding day – that is suggested as much in the interplay of trepidation and disillusionment in the four watchful eyes as it is in the subtle finery of the maybe-bride’s white dress. The image is called *The Electrician*, from the series *Pseudomnesia* (2022 - ongoing), a Greek term relating to pseudo memory, or false memory. Eldagsen says, “I love photography, I love generating images with AI, but I’ve realised, they’re not the same. One is writing with light, one is writing with prompts. They are

connected, the visual language was learned from photography, but now AI has a life of its own. If people want to be silent and not talk about that, that's wrong" (Williams 2023). Even before beginning his experimentation with AI, Eldagsen's work was conceptual rather than figurative. "My approach to photography was psychological and philosophical. It was a journey inside; it was not depicting what everybody sees in front of them. Having that background, AI fascinated me. It was built from the collective unconscious. I also saw that the way it works can be related to Plato's theory of ideas [also known as the theory of forms]" (Williams 2023).



Fig 2.21: Boris Eldagsen *The Electrician* [detail] 2022, Digital print from the series *Pseudomnesia*

The *Pseudomnesia* series as a whole is of interest to this research. Using the visual language of the 1940s, Eldagsen creates images as fake, non-existent memories of a past. These

images were imagined by language, and re-edited more between 20 to 40 times through AI image generators, combining “inpainting”, “outpainting” and “prompt whispering” techniques. Eldagsen believes that “just as photography replaced painting in the reproduction of reality, AI will replace photography. Don’t be afraid of the future. It will just be more obvious that our mind always created the world that makes it suffer” (Williams 2023).

The controversy around *The Electrician* as an image was based on notions of humans beijing ‘tricked’ by AI. I am more interested in the extended series’ aesthetic, and how it utilises a specific historical style (mid-century black and white analogue photography and film) combined with visual Uncanny Valley queues in a way that is reminiscent of vintage analogue media such as The Twilight Zone, with its implicit retro-futurism. Similarly, with my own AI and analogue print experiments, I sought to not replicate exactly Goya’s aesthetic and material outcomes, but reference them in a way that clearly illustrated digital glitches in both the image processing and the printing itself.

Originality and Reproduction: Discussion

It is better to fail in originality than to succeed in imitation

Herman Melville (1850)

During the Renaissance and the following three centuries, there was a strong emphasis on the worship of beauty, which took on a ritualistic character (Benjamin 1935; 6). This worship was not rooted in religious practices but rather in secular contexts, particularly from the 16th and 17th centuries of the Renaissance up until the 19th century. However, this secular worship of beauty began to change with the arrival of revolutionary methods of reproduction. Art felt the approach of that crisis, which a century later has become unmistakable, and reacted with the doctrine of “art for art's sake” (Evans 2013), that is, with a theology of art. Benjamin says that even in the 19th century, when photography was going to instigate the withering of the aura, there was a counter-reaction, a movement analysing, ritualising, and theologising art.

Fast forward to 2006. From 1563 to 1797, the *Wedding at Cana* by Paolo Veronese adorned the back wall of the Palladian refectory of San Giorgio Maggiore in Venice until Napoleonic troops removed it and brought it to Paris, where it still resides at the Louvre. The English artist Adam Lowe founded Factum Arte in Madrid in 2001, and he received a commission to produce a

1:1 replica of the work to hang on the same wall as the original (Povoledo 2007).



Fig 3.0: Digital reproduction of the 16th-century painting *The Wedding at Cana* being installed in Venice

The creation of the facsimile was received very favourably by the general public, and sparked a wide debate on various topics, including that of the modern notion of 'copy'. For example, Jean Clair says in *The Winter of Culture*:

The example of the replica of the Wedding at Cana in Venice leads to a strange reversal of Benjamin's ideas: it is the reproduction that, thanks to technical perfection, returns to the deteriorated and distorted image, after its relegation to the walls of a museum, an aura in the place where and for which it was conceived... Walter Benjamin seems to have forgotten that before romanticism and for centuries, the idea of the original and the practice of signing were things that did not even touch the mind (Clair, 2011).

Benjamin's notion of aura is reinterpreted here by Clair to propose that aura is less something imbued by the artist into the work during its creation but something that is created by the context of an artwork's display.

And that is precisely why contemporary art became the medium for investigating the eventfulness of events—the different modes of immediate experience of the events, their relationship to documentation and archiving, and the intellectual and emotional modes of our relationship to documentation. Now, if the thematisation of the eventfulness of the event became, indeed, the main occupation of contemporary art in general and the museum of contemporary art in particular, it makes no sense to condemn the museum for staging art events. On the contrary, today the museum is the main analytical tool used to investigate the contingent and irreversible, in our digitally controlled

civilisation, which is based on retracing and securing the marks of our individual existence, in the hope of making everything controllable and reversible (Groys 2016).

Postmodernism is marked by the belief that all ideas and images have been previously explored (Sturken and Cartwright 2009; 328). It poses the question of whether there can truly be original concepts and depictions, and whether this is significant. Contemporary visual culture is characterised by an abundance of copies, parodies, replicas, reproductions, and remixes, which have undermined the notion of a stable image or form in the realms of art, architecture, and popular culture.

Artists in this realm acknowledge and engage with the mediated nature of their creative process, often incorporating references to popular culture, internet memes, and digital aesthetics, there is a self-awareness and reflexivity to their process. They explore the impact of digital technology on artistic production and challenge traditional notions of authorship and originality. With the democratising potential of the internet creating a global platform for sharing and distributing artwork, artists have the opportunity to reach wider audiences beyond the confines of traditional art institutions. This accessibility allows for new voices and perspectives to be heard, challenging the dominance of established art hierarchies. Chan observes that many artists are using their work to explore the potential dangers of a world where digital media is increasingly dominant and to critique how

technology shapes our lives. They examine issues of surveillance, data privacy, algorithmic biases, and the impact of social media on our social interactions and self-identity. Simultaneously, post-internet art celebrates the creative possibilities offered by digital technology via experimentation with new tools, software, and platforms, pushing the boundaries of artistic expression. Artists explore the aesthetics of glitch, remix, and appropriation, challenging traditional notions of artistic craftsmanship.

The concept of most relevance and interest to my research is Chan's assertion that "Everything has been done; you can only do it better. Everything is a remix"(Chan; 110). It can be argued that almost all creative endeavours are influenced by existing ideas, concepts, and works. In the creative process, artists frequently look to the past for ideas, build on previously acquired information, and recombine elements in novel ways. The creative process inherently includes the idea of "remixing" or expanding upon what has been accomplished in the past. In this way, you could say that every new invention is a remix or a reinterpretation of components that have already been in the world. On the other hand, it is essential to recognise that creative experimentation can result in ideas that are genuinely original and ground-breaking, ideas that go beyond the confines of pre existing frameworks. Even while drawing inspiration from previous works and being influenced by them, there is still room for creations that are truly original and revolutionary.

In an era where our attention is highly valued as a commodity (Lane and Atchley 2021) popular ideas and images hold significant influence. Despite the notion of change, familiar concepts are often repackaged as new, much like the recommended playlists on Spotify. As Soraya Roberts outlines in her essay on viral resonance *On Flooding: Drowning The Culture in Samenes* (2019) we tend to focus on a select few individuals and ideas, neglecting the contributions of others.

The concept of the Airbnb aesthetic, or ‘IKEA aesthetic’, embodies a sense of uniformity and espouses a socialist ideology. It is this aesthetic that I consciously chose for the Zephyr Nova website owing to its ubiquity, it is reminiscent of a societal structure that mirrors the Scandinavian model, wherein wealth is redistributed, resulting in a scenario where individuals possess identical or slightly modified furniture. Similar to the Airbnb aesthetic, IKEA can be considered as one of the pioneering instances of a comprehensive standardisation of design, drawing upon the Bauhaus principle of promoting good design accessible to all individuals (Mitchell 1999; 80-88).

Charles-Édouard Jeanneret, known as Le Corbusier, was a Swiss-French architect, designer, painter, urban planner, writer, and one of the pioneers of what is now regarded as modern architecture. He discussed the concept of the "machine for living," emphasising the increasing simplicity, cleanliness, and

replicability of a template for living (Passanti 1997; 438–451). Le Corbusier expressed that it is imperative to devise solutions for present-day predicaments, such as tenement housing and education, employing a design approach that is not only socially conscious but also ensures optimal functionality.

This discourse explores the philosophical correlation between the unified mediaeval conception of reality and the existence of objectively verifiable entities. It further delves into the subsequent era of enlightenment, which ushered in a perpetual course of social fragmentation and disunity. This phenomenon, characterised by both celebration and apprehension, serves as a projection of society's self-destructive inclinations. Emerging from a profound existential quandary, there exists a pervasive apprehension regarding the potential for an uncontrollable trajectory leading to our own demise.

A machine's potential for sentience, demonstrated by its ability to express ideas or words, is the basis for assigning it considerable value (Du Sautoy 2019; 2). Computers have many meanings, but they also represent a fragmented reality as opposed to a modernist utopian idea of a united whole. The purposeful omission of decorative components was a hallmark of international modernism, and it appears that the rise of an artificial intelligence aesthetic is reviving this ‘more is more’ style.

Can we say with certainty if computer-generated art has aura? Benjamin's definition requires that the response be categorically ‘no.’ However, Groys' view that this aura loss is irreversible in the computer environment, and can only be ‘cured’ by curating, bringing it to the exhibition space, and taking on the sacerdotal function of visualising the Invisible, bears consideration. In other words, the digital picture is only ostensibly omnipresent and indefinitely replicable anywhere: the digital image has to be positioned in a specific location (the exhibition space) in order to "guarantee its own identity in time," as stated by Groys (Groys 2008; 84). Groys uses Walter Benjamin's "topological definition of aura," as he refers to it, to explain how the installation media might transform art documentation back into art (Groys 2008; 53–65). Benjamin asserts that even the most accurate replication of a piece of art is deficient in one aspect: its existence in time and space, its singular existence in the location where it is found. The idea of authenticity requires the existence of the original (Benjamin 1935). Benjamin refers to this presence—better rendered as "it's here and now"—as an artwork's aura (Benjamin 1935). Mechanical replication, therefore, doesn't eliminate the aura, but rather diminishes "the quality of its presence," as "by making many reproductions it substitutes a plurality of copies for a unique existence." Additionally, it reactivates the replicated object by allowing the beholder or listener to encounter it in his own unique circumstance. This is an important distinction: the aura is not gone; rather, we just lose the capacity to detect it as we diminish the value of the present moment. In Groys' words,

"(post)modernity enacts a complex play of removing from sites and placing in (new) sites, of deterritorialization and reterritorialization, of removing aura and restoring aura" (Groys 2008; 64), aura can be restored thanks to the growing significance of what Benjamin refers to as an artwork's "exhibition value."

In the next chapter we look at the *systems model of creativity* as a construct and therefore unique to human experience. I will contextualise and expand on the key research themes within a condensed history of generative art and AI, and illustrate how we ended up where we are today.

Chapter Three: Computational Creativity

Artwork 3.1, Copper AI Leaves

Design

As a means of investigating ideas of ‘Computational Creativity,’ I created two separate sculptures that exemplify the intersection of AI-generated design and traditional craftsmanship. Firstly, I crafted two copper sculptures inspired by AI-generated designs of leaves. The first sculpture was based on a direct prompt entered into Midjourney, asking for a depiction of a leaf. The second sculpture was derived from a more nuanced process, where I asked ChatGPT to describe a leaf to an AI with no understanding of nature. This description was then used as a prompt in Midjourney to generate a design. Both designs were subsequently transformed into small-scale sculptures through traditional copper-smithing techniques. This process allowed me to explore how different types of AI inputs could influence the creative outcomes and how these digital designs could be translated into tangible artworks using traditional methods.

Secondly, I generated images of ‘grotesque’ vases on Midjourney, a platform known for its AI-driven artistic outputs. These designs were then brought to life using Potterbot, a digital 3D ceramics printer. This method not only utilised AI for the initial design phase but also integrated advanced digital fabrication techniques to produce the final ceramic vases. The use of Potterbot highlighted the seamless transition from digital to

physical realms, showcasing how AI can assist in creating complex forms that might be challenging to achieve through manual pottery techniques alone.

Both experimental artworks are highly relevant to research into computational creativity. They illustrate the diverse ways AI can contribute to the creative process, from initial conceptualization to the final physical manifestation. The copper sculptures emphasise the interpretative nature of AI-generated designs when paired with human craftsmanship, revealing insights into how AI understands and recreates natural forms. In contrast, the grotesque vases demonstrate the potential of AI to push the boundaries of traditional art forms, generating novel designs that can be precisely realised through digital fabrication. Together, these artworks provide a comprehensive exploration of the capabilities and limitations of computational creativity, highlighting the unique contributions AI can make to the artistic process and how it can be harnessed to expand the horizons of traditional art practices.

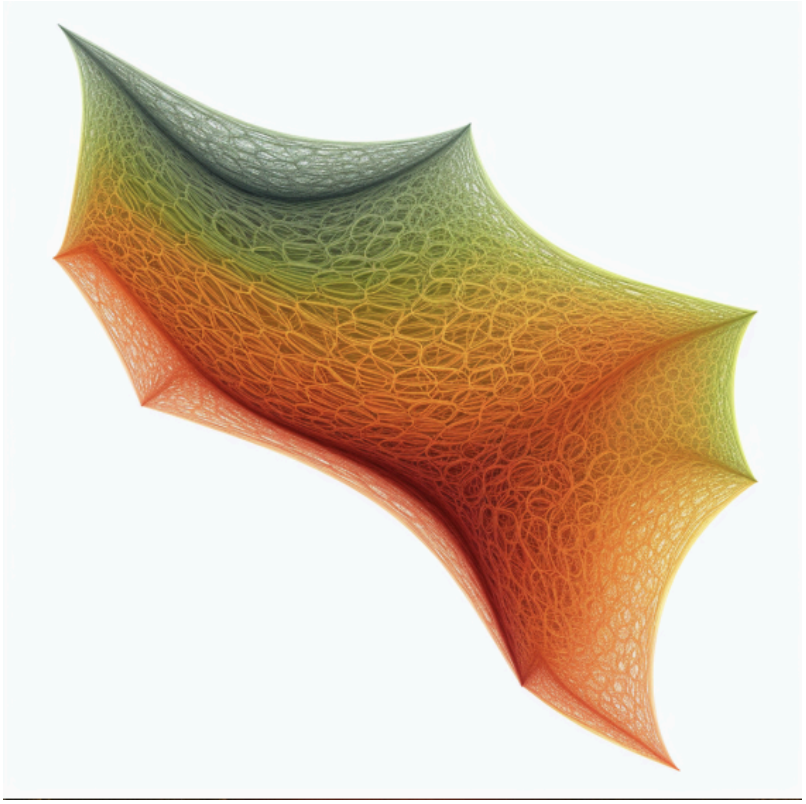


Fig 4.0: Midjourney, Prompt: “Explain a leaf to an AI who has no understanding of nature”, 2022



Fig 4.1: Midjourney, Prompt: “leaf”, 2022



Fig 4.2: Copperplating tools used



Fig 4.3: Copperplating anvil and stand

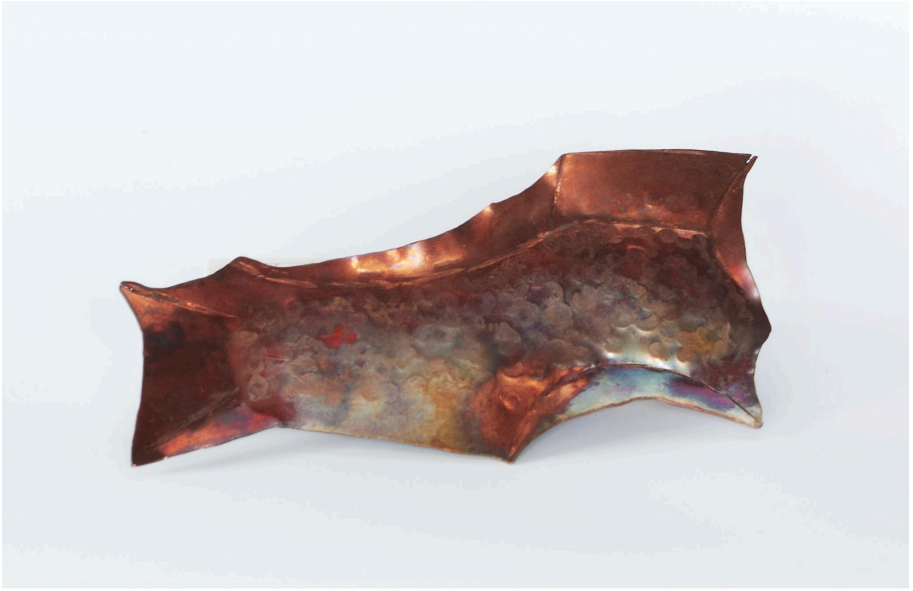


Fig 4.4: Catherine Bourne, Material outcome of experiment, 2022, Copper



Fig 4.5: Catherine Bourne, 2022, Material outcome of experiment, Copper

Implementation

Despite not having worked with copper, or metal at all, previously I wanted to use copper as a means to create an object completely by hand using traditional metalworking methods. In their most powerful computer chips, IBM and others use copper instead of aluminium. Because of copper's superior electrical conductivity, this technology enables conductor channel lengths

and widths to be significantly reduced. The result is much faster operating speeds and greater circuit integration—400 million transistors can be packed onto a single chip. Most electronic components generate heat which can cause them to age and fail prematurely. This is especially true for today's highly integrated microprocessors (computer chips). Copper's thermal conductivity, or capacity to conduct heat, is about 60 per cent greater than aluminium, so copper can quickly remove much more heat. The more heat removed from the processor, the more efficiently it will operate, with less potential for damage to other critical components. In medical science copper and its compounds were already used by Egyptians and Greeks for personal hygiene and continue to be used today for their antimicrobial qualities (Mitchell 2023).



Fig 4.6: Fuseworks. *Artificial Botany,* 2020 - ongoing, AI Installation



Fig 4..7: Fuseworks. *Artificial Botany,* 2020 - ongoing, AI Installation

I was inspired by the ongoing project of *Artificial Botany* (2020 - ongoing), which aims to investigate the latent expressive potential of botanical illustrations by employing machine learning algorithms. Prior to the advent of photography, botanical illustration served as the sole means of visually documenting the diverse array of plant species. The aforementioned images were employed by professionals in the fields of physics, pharmacy, and botanical science to facilitate the processes of identification, analysis, and classification. Although these works may lack scientific relevance in the present day, they have served as a source of inspiration for artists who utilise modern tools and methodologies to pay tribute to life and nature. Artificial Botany utilises public domain archive images of illustrations created by renowned artists within the genre, such as Maria Sibylla Merian, Pierre-Joseph Redouté, Anne Pratt, Mariann North, and Ernst Haeckel.

The process of organismal development involves a complex interplay of various forms that are transmitted and interconnected. Within this context, the plant serves as a symbol representing the innate creative potential of nature. This ongoing process of organising and moulding forms involves the interaction of two contrasting forces: firstly, the inclination towards formlessness, characterised by the fluidity of transition and change; and secondly, the persistent capacity to endure, represented by the principle of solidifying the flow, without which it would dissipate indefinitely. Within the process of plant development, the interplay of expunction and contraction gives rise to a dynamic wherein beauty becomes evident. This beauty is characterised by a fleeting moment of equilibrium, which defies permanence as it emerges during the plant's formation and simultaneously begins to transition into the subsequent stage.

The illustrations have been utilised as educational resources for a machine learning model known as GAN (Generative Adversarial Network). This model undergoes a training phase, enabling it to generate novel artificial images that closely resemble the original images in terms of morphological elements. However, the generated images possess intricate details and features that mimic those typically produced by human painters. In this context, the machine engages in the process of re-elaborating the content, thereby generating a novel form of communication that encompasses both the informational and artistic aspects inherent in human and natural domains. It is this

fusion of historical and computer-generated (or re-processed) imagery that was to serve as inspiration for my material investigation using copper.

Analysis

The experimental results of reimagining AI-generated designs effectively demonstrate a correlation with the reference images. The utilisation of a blowtorch to subject copper to heat, resulting in the production of diverse hues, proved to be an effective method for colouring the artwork. Copper as a material is highly malleable. The cultural legacy of copper is significant in its impacts on the context of the object.

Artwork 3.2: Grotesque Vase

Design

My 2013 MFA *The Grotesque as a Contemporary Means of Representation* (Monash University, Australia).

I am interested in ways that anxiety, fear and violence can be sublimated into an artistic form. I explore this transition by depicting states of psychic or mental anguish expressed through blurred, distorted physical forms…. Employing the grotesque in my own work offers me the ability to destabilise the known world through my creative practice. Our contemporary understanding of the grotesque differs from its historical usage. My research explores the relevance of the grotesque as a contemporary means of representation. My work aims to bridge this gap

between the historical grotesque and a more abstract contemporary usage… It has enabled me to develop a deeper understanding of the implications and limitations of depicting psychological and physical representations of violence (Bourne 2013).

As a means of experimentation, I chose to utilise digital fabrication technology in the form of the PotterBot, a digital 3D pottery printer. The design of a vase was based on Midjourney AI images using the Prompt “grotesque vase”:



Fig 4.8: Midjourney image, Prompt: “grotesque vase”, 2022

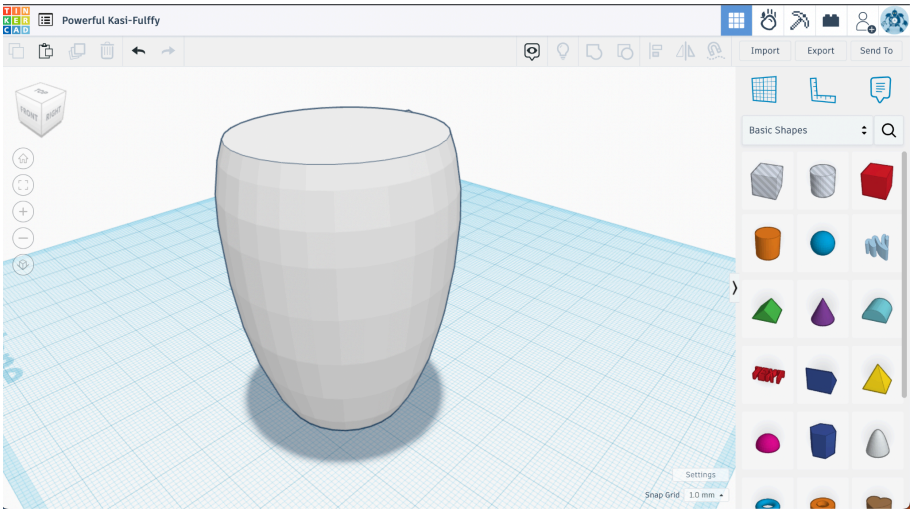


Fig 4.9: Catherine Bourne Digital 3D vase design, 2022

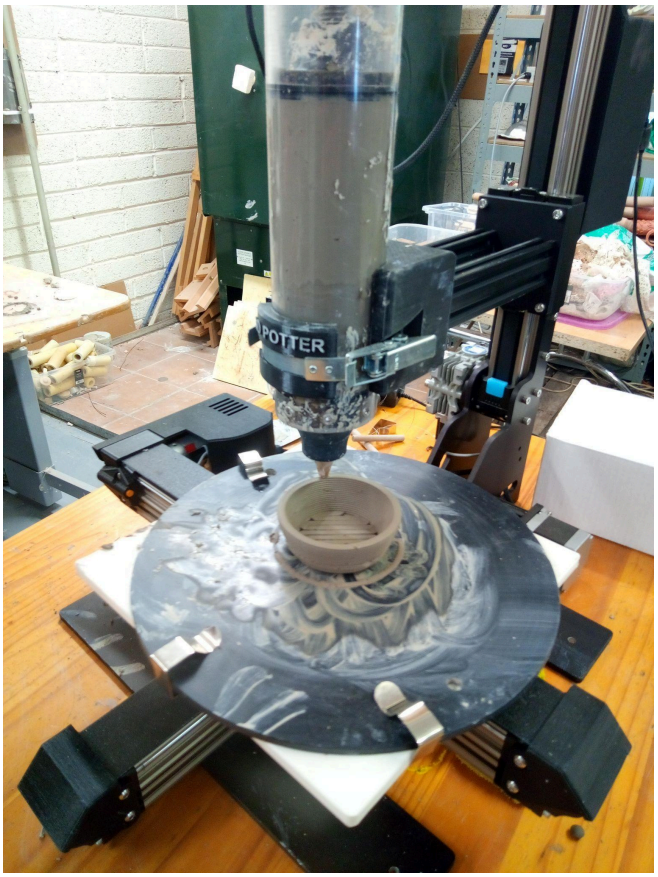


Fig 4.10: : 3D PotterBot 10 Micro



Fig 4.11: Catherine Bourne, Grotesque Vase, 2022, Clay



Fig 4.12: Catherine Bourne, Grotesque Vase detail, 2022, Clay

Implementation

The design of the vase was created by means 3D fabrication software, with the creation of shapes via a similar process to traditional CAD (Computer Aided Design) software techniques. Unlike 3D printing using plastic-based filament, which dries almost immediately upon printing, the process of printing with the

Potterbot using clay does not allow for cut-out features within the structure as the wet clay will slip or collapse into the void left in the design. For this reason, the grotesque elements of the design had to be implemented by hand after the vase was printed.

Analysis

This technology is very useful for commercial and industrial applications. The process of printing whereby a thin strand of clay is printed in a coil formation created a very sturdy structure (as visible in Fig: 4.12) and resulting in a lined texture. Once the vase was printed, I experimented with pushing the structure by hand to create a lumpen, mottled effect. This was not possible—the structure would stretch but then return to its original shape, the only way to manipulate the structure was to cut directly into the clay, the fabrication was too robust. This illustrates the limitations of current digital fabrication technology for artists interested in non-standard design.

Using the Midjourney reference image, I identified the uneven ‘facial features’ of the design and replicated these by hand. The outcome is of poor quality. I intentionally kept the printed graduated lines as a means of illustrating the fabrication of the vase. However, this meant that every time it was handled fingerprinted indentations appeared, obscuring the lines and creating an ad-hoc, unfinished aesthetic. The facial features were smoothed to represent an internal ‘undoing’ of the object, eliciting a grotesque aesthetic, this was not enough to truly

reflect on the MIdjourney reference image design. In conclusion, this type of object, at this point in time, must be produced by hand. Within contemporary practice, a means of circumventing unwanted fabrication marks here would have been to glaze the object, thus giving it a uniform appearance at least with regards to surface marks. However, I wanted to expose the inherent limitations of the technology, particularly the inability of the technology to create void spaces.

Artist Ben Snell, who operates at the intersection of artificial intelligence and traditional sculptural techniques, was an inspiration for this experimentation. His practice explores the role of AI as both a creative collaborator and a conceptual framework, delving into questions of authorship, originality, and the relationship between human and machine creativity.

Snell's work is characterised by a unique process that involves training AI models to generate sculptural designs. He feeds the AI data from a variety of sources, including 3D scans of classical sculptures and images of contemporary art. This data becomes the foundation upon which the AI generates new, unique forms. Snell then interprets and refines these forms, fabricating them into physical sculptures using traditional materials and methods. This process highlights the collaborative nature of his work, as the AI's initial designs are transformed through Snell's artistic vision and craftsmanship.



Fig 4.13: Ben Snell*, Dio, computer, resin, (*2018)

One of Snell's most notable projects is *Dio* (2018), a sculpture created by training an AI on a dataset of 3D scans of classical sculptures. The AI was tasked with generating a new form that Snell subsequently fabricated using a mixture of digital and manual techniques. The resulting sculpture is a haunting, fragmented figure that embodies both the precision of AI and the imperfections of human touch. *Dio* exemplifies Snell's exploration of the symbiotic relationship between human and machine, demonstrating how AI can be used as a tool to extend and augment traditional artistic practices.The work also engages deeply with the concept of authorship. By incorporating AI into his creative process, he challenges traditional notions of artistic

authorship and originality. The AI acts as a co-creator, introducing an element of unpredictability and innovation that Snell harnesses and directs. This collaborative dynamic raises key questions of interest to my research regarding the nature of creativity and the extent to which it can be mechanised.

Alexander Reben is a MIT-trained roboticist whose work investigates our relationships with algorithms, automation and amplification using experimentation and prototyping, absurdity and humour, and mischief and play to engage the public with complex ideas in technology. Reben collaborates with AI (GPT-3) to create material-based sculptural installations, wherein AI generated text provides a basis for a sculpture or painting in physical form – some of which Reben executed himself; others were generated by a second AI art tool, such as Dall-E 2 or Stable Diffusion, before being painted or sculpted by a human being. For example, his sculpture *Time to Eat (Black Forest Steak Red #9)* (2022) is a sculpture consisting of a flip-clock and can of beef stew hybrid object.



Fig 4.14: Alexander Reben, *Time to Eat (Black Forest Steak Red #9),* mixed media, (2022)

The AI's description:

This sculpture consists of a flip clock which is scrambled like a bad dream. It sits upon an empty can of stew that the artist ate because it was time for dinner, and she was hungry. The scrambled clock suggests that the artist has become lost in time, that she has no sense of what time it is, and where it is. The fact that she ate the stew in order to stay alive indicates that the artist is physically trapped, and has no way to escape. Many have speculated about the meaning of the particular can of stew that the artist has chosen to use as a pedestal. The can of stew was created by the Hormel Company, and the artist's name is Julia Hormel. The can is therefore a symbol of the artist, and the missing stew inside the can is a symbol of the artist's lost

creativity. In addition, the label states that the can contains "no preservatives", which is a statement about the artist's inability to create due to the presence of inauthentic art in the world. The artist wrote about the work, saying, "It is a piece about my impotency in the face of the techno-commercialism that surrounds me, and the inability of the language of the avant-garde to meet it on equal terms."

Another work, *The Final Resting Place of the Queen Bee* (2022) is a wall-mounted sculpture consisting of toothpicks stuck in a canvas that have been dipped in beeswax. The AI proposes that “The artwork is a commentary on the plight of bees and the canvas represents the bee hive during colony collapse disorder, in which the bees simply disappear from the hive, leaving the queen behind in an empty space. This sculpture was created as a form of activism and in support of bee colonies worldwide.”

Reben’s literal interpretation and fabrication of the AI prompts aligns closely with my own motivation, and conceptual and aesthetic decisions taken, in the creation of my experimental objects. Key to the process is the notion of irony, and play. The descriptions generated mirror those of the fictional Zephyr Nova artworks in that they closely resemble text based artwork documentation, but are inherently superficial. Additionally, as within my own experiments, it is hard not to feel that the AI is not somehow ‘in on the joke’ when outputs themselves sound like meta-irony (such as “In addition, the label states that the can

contains "no preservatives", which is a statement about the artist's inability to create due to the presence of inauthentic art in the world").

Computational Creativity: Discussion

Works of art make rules; rules do not make works of art - Claude Debussy (1908)

By definition, computational creativity is applied to study, simulate, and enhance human creativity, it is a branch of artificial intelligence that has been studied since the middle of the 20th century but has only become truly capable of mimicking human creativity in the past decade (Du Satoy 2019). The field of artificial creativity not only produces machines that are capable of producing art, music, and solving problems. Among other things, it also studies the notion of creativity and training machines to enhance their own abilities.

The *systems model of creativity* looks at creativity as a social construct and an interaction between three different sources: culture, society, and the individual (Sirkova 2012 ;115–138). In the systems model, creativity exists because our domain (or culture), our field (or society), and our person (or individual) interact at all times to create new experiences. Our culture frequently dictates what our beliefs and laws should be. A person who is raised in a certain culture acquires its beliefs and customs. If the individual then produces something new, it is either approved or rejected by the society to which they belong. In the event that it is approved, it eventually merges with the

culture. If society rejects it, it goes back to the person to be either improved upon or discarded, this explains why some trends persist while others fade away from culture. This model incorporates the concept of systems more explicitly when explaining the emergence of a creative (or created) artefact. Essentially, in the system model of creativity, creative ideas and products result from the interaction of the individual, the domain, and society. This view holds that the dynamic aspects of the social and professional environment are the catalysts for the creation of new artefacts that are regarded as uniquely distinctive by their peers. Anna Jordanous, senior lecturer in the School of Computing at the University of Kent, researches human and machine creativity. She says, “Most people are relatively happy with novelty and value as a definition of creativity, certainly subject to aesthetics and correctness” (Miller 2017).

As discussed in the first chapter, when investigating a broad topic like creativity, there are numerous disciplines and approaches. One of these approaches investigates how the brain responds to creative experiences. AI researchers investigate the sub-symbolic levels of human cognition, how our brain functions during cognitive processes, and how our brain reacts when we experience something we consider creative. Related to this inquiry is the field of neuroaesthetics, in which researchers have examined how visual and auditory experiences of beauty elicit a specific response in the brain, where our affective systems for delight are housed in deep structures away from the brain's

surface. It combines neurobiology, which investigates how our minds function, with aesthetics, which investigates the nature of beauty (Strathausen 2017; 187–226).

Neuroaesthetics is a relatively new discipline aiming to study how our brains react to beauty and creativity, specifically in an art context. The foundation of this research includes concepts such as natural selection, and sexual selection, which have both been driving factors in human evolution (Strathausen 2017; 187–226). Humans naturally gravitate towards things that we find aesthetically pleasing and beautiful, rooted in our evolved instincts. However, while we understand that our brains relish aesthetically pleasing experiences, researchers have yet to determine precisely what brain mechanisms are responsible for this behaviour. As visual and auditory experiences of beauty trigger certain brain reactions, we are more likely to want to repeat experiences that we find aesthetically pleasing (Strathausen 2017; 187–226). According to significant historical and contemporary research, our brains are similarly wired to seek and enjoy aesthetically pleasing encounters as well as creative objects and processes (Clay 1908, Brown 2011). Evolutionary biology can be applied to the question of why this occurs, as natural and sexual selections that increase our chances of survival and reproduction, respectively, determine what we consider beautiful. Any physical characteristic that signals such inclinations can function as an attractor. This explains why, despite differences in history and culture, some

characteristics, such as a baby's face, are universally alluring, although it is important to note that the evolutionary logic of beauty is not a normative assertion (Beardsley 1962; 617–628). This research can explain the brain mechanisms and biological drivers underlying a variety of creative activities, including the production of aesthetically pleasing objects and the desire to experience them. However, these theories do not explain why artists are drawn to creating more meaningful or complex artefacts, or why they pursue creative activities that can be challenging, such as attempting to solve a difficult problem or develop a new idea.

As discussed, during the Age of Enlightenment (1685 - 1815) the idea of creativity departed from being an extension of, or representations of the divine at which point it began to be used to describe individuals (Mould, 2018). During the Romantic era, when the notions of fantasy, personal struggles, and disorders were paired with the notions of genius, this trend of individual creativity grew even stronger (Morgenstern 1920). Gradually, this exclusive notion of creativity waned as the discipline of psychology formally incorporated the notion that creativity is innate to every individual. The concept of creativity was democratised by emphasising that it was neither a gift nor a curse conferred upon a particular individual. Creativity was attributed to more functional activities that provide economic value, such as problem-solving, in addition to those historically associated with art production. It should not come as a surprise

that, as scientific progress has pushed the boundaries of our comprehension of intelligence, the term creativity has been applied to diverse human-made activities and artefacts whose characteristics inspire our imaginations and compels us to consider our individuality.

The development of artistic practices and culture, like the rest of our existence, is dependent on the instruments at hand. This dependence is evident in the fact that artists can only express and objectify what the tools and technology of their time permit, whether they are concretely fabricated tools, or abstract or intellectual tools. By concrete material-fabricated instruments, I mean all media and resources, such as paper brushes or wall-painting pigments. Any form of art practice, whether abstract or conceptual, uses these tools in conjunction with skill and knowledge. On the other end of the spectrum, tools can refer to abstract knowledge in philosophy, linguistics, or mathematics. These conceptual tools are essential because they are the ones that enable the concepts of generativity via the application of repeatable sequences of action, as in the case of simple geometrical shapes. The term algorithm derives from the ninth-century Persian mathematician Muhammad ibn Musa al-Khwarizmi, born around 780 CE in the region now known as Uzbekistan, but the concept predates him by centuries (Bosworth 1963). The geometric patterning that culminated in Islamic ornamentation is a classic example of non-figurative decoration. This patterning relied on a generative algorithm very early on, as

it evolved from simple to complex between the fifth century BC and the present day when these complex visual constructions were generated from simple forms such as large circles and polygons. They were duplicated and arranged into intricate patterns by combining geometric patterns through the utilisation of tiling, repetition, rotation, and arabesques.

Since its inception, mathematical knowledge has influenced art. In particular, the concept of ratio has been central to the rationalisation of society and the development of various mathematical concepts. The *Golden Ratio*, approximately 1.618, corresponds to the geometrical relationship in a rectangle. It has been used in various dimensions for lines, rectangles, and volumes since antiquity. The Greeks later named it, and it was abundantly employed throughout the Renaissance, and it has been applied to geometry, visual art, and architecture (Jarvis and Adams 2007).

In 1490, Leonardo da Vinci, in his book, *Divina Proporcion*, attempted to capture the ratios of the human body. This illustration is a study of the proportions of the ideal human body as put forth by the first-century architect Vitruvius. The book's title refers to the Golden Ratio and its application to geometry, visual art, and architecture (da Vinci 1490).

The human body is considered God's supreme creation, and it's perfect geometric proportions serve as a model for proportions in

architecture. However, Leonardo believed that proportions should go beyond describing the body or generating architectural proportions. Science and art were aimed at revealing the perfect geometric proportions that govern the world.

During the Renaissance, perspective was invented or, perhaps perfected, allowing three-dimensional forms to be represented on a two-dimensional surface. The development of geometric modification of space was progressing with the work of people like Leon Battista Alberti and Leonardo da Vinci. More and more machines were imagined, conceived, and created, with the first flying machines being explored.

In the late 19th century, technological developments took place in visual art, photography, and cinema. Progress in mechanics, optics, and chemistry made photography possible, leading to debates about whether photography is an art form, which we discussed in the previous chapter. Painting evolved and non-photorealistic styles emerged as a consequence of the invention of photography. New aesthetics like impressionism and pointillism were introduced, leading to the emergence of new aesthetics like Cubism. Joseph Czinger, a composer, produced some of the first truly algorithmic paintings with his graph format in the 1930s.

The 1940s were characterised by the Second World War, which served as a catalyst for the development of numerous

advancements that later flourished in the 1950s. The Von Neumann architecture, which serves as the fundamental framework for contemporary computers, played a pivotal role in the development of generative processes (Mitchell 2020; 26). This marked the beginning of digital art, with the rise of cybernetics and the concept of autonomous machines that accept inputs through sensors and act on the world through effectors. Computers have revolutionised the way we think about algorithms and processes, and with the democratisation of technology, generative art has emerged. The first generative practice in literature and poetry was the cut-up technique (or *découpé* in French), an aleatory literary technique that involves cutting up and rearranging a text to create a new text. This technique was popularised in the late 1950s and early 1960s by writers like William S. Burroughs.

Within the realm of visual art, artists were engaged in the exploration of electromechanical methods, exemplified by John Tinguely's *Mathematical Number Nine* (1958). Certain artists, such as Ben Lepofsky, employed analogue electronic apparatus, including oscilloscopes and wave capture devices, in their artistic practice, specifically by applying them onto photographic paper.

Drawing machines, created by American visual artist Desmond Paul Emery, came into being as a result of the early promise of computers in the visual arts. Emery was a veteran of the Second World War and recycled military analogue computer equipment

from the war to develop sophisticated drawing machines. Similarly to how the availability of 16mm film cameras—originally developed for use on bombers—led to the French New Wave of filmmaking (Virillo 1986), Emery's fascination with the inner workings of electromechanical processes led him to transform a bomb-sight computer into an art-making machine that relied mainly on the mechanics of chance. This meant that drawing machines could not be pre-programmed or store information, unlike conventional computers.

One Year Performance (1980-1981) is composed of 8,627 mugshot-style photographs taken in the Manhattan studio where Tehching Hsieh spent one year striking a time clock every hour, on the hour, 24 hours a day. The photographs document a period during which the Taiwanese-born performance artist underwent an extraordinary ordeal of sleep deprivation in order to investigate the nature of time and meticulously observe its passage.

The ensuing exhibited work displays the supporting documentation for the preceding work: 365 punch cards, 365 film strips depicting an increasingly long-haired and bleary-eyed Hsieh, the plain grey uniform he wore, a 16mm film he created condensing the year into six minutes, witness testimonies attesting to his rigorous routine, and the time clock.

Time Clock Piece, as the work documented in the installation is colloquially known, recalls for Hsieh the labours of Sisyphus, who in Greek mythology was compelled to repeatedly roll a rock up a mountain, only to see it tumble back down. While it may appear to convey a message about the monotony and conformity of industrial labour, he asserts that he is "not a political artist, but people are free to interpret my work from a political perspective... I am intrigued by the universal conditions of human existence" (Marks 2014).

Shaving his head at the outset and photographing himself each time he struck the clock, he missed only 133 clock-ins, primarily due to oversleeping despite carrying a particularly loud alarm clock. The individual frames he captured with a movie camera were subsequently compiled into a film in which each day is compressed into one second.

The artwork serves as a compelling illustration of how algorithms, or predetermined sets of rules, can serve as the foundational and creative impetus for artistic production, as a precursor to computerised algorithms. Nevertheless, it is important to note that the physical presence of the artist's body remains constant, thereby creating the possibility for unforeseen occurrences.

The focus of computational creativity, sometimes referred to as meta-recreation or artificial creativity, is computational creative

processes. This new discipline investigates both actual and potential creative processes. When we investigate creative processes as they are, we pose queries such as, can creativity be understood? If we comprehend it, are we able to reproduce it? If we can model it, are simulations possible? This investigation of creative processes is a valid field of scientific inquiry that pertains to the entirety of the cognitive sciences. There is also an examination of creative processes, which may be independent of what we observe in nature. These are processes that we know humans cannot perform without machines, but that we believe may have fascinating behaviour or outcomes. In doing so, we consider not only what creativity is, but also what it might become.

Computational creativity differs from Artificial Intelligence in that it focuses on creative tasks without clear optimality, unlike rational problems. Computational creativity develops computational models of these processes, aiming to simulate or produce creative behaviour. These systems are called artificially creative systems, meta-creative systems, or meta-creations, and focus on user interface design, decision support, and data modelling techniques to encourage user creativity. The field emphasises methodologies to evaluate these systems and their quality compared to human creativity.

While computational creativity has its origins in generative art, the scope of computational creativity is broader than that of

generative art, as not all creative tasks are artistic or only artistic, such as architecture or cooking, which are also clearly functional. In addition to developing artistic processes, the objective of research in computational creativity is to comprehend the creative process in general. In contrast, computational creativity is more limited than generative art because computational creativity implies the explicit use of computers, whereas generative art does not.

Generative Art refers to a creative activity wherein the artist employs a system, such as a programme with an algorithm, or any procedure or invention that is set in motion with a degree of autonomy, resulting in the production of an entire work of art (Soddu 2019). Generative Art is neither an art movement, an ideology, an aesthetic form, nor a theory or aesthetic. Instead, generative art refers to the process of creating artwork, not its purpose or subject matter. Generative art can be defined as any practice that incorporates processes set in motion with some degree of autonomy and results in an artwork. The system used to produce the artwork need not be a physical mechanism; it can be conceptual.

Computational creativity research is essential for various disciplines and creative processes, with its foundations in cognitive science, mathematics, artificial intelligence, synthetic life, and machine learning. It has numerous academic and scientific applications and is supported by practical and financial

factors. The growing demand for creative and entertainment computing is due to the shift from linear to nonlinear media formats, which require human creativity to ensure exceptional quality. Computational creativity and generative art are particularly important in the area of human-computer interaction software, as we currently use software for editing pictures, videos, and music. Artists desire more fluid interaction with the machine, allowing them to free themselves from their limitations and conceptualise their pieces.

Generative art is an ancestral cultural practice in which artists transfer some of their creative autonomy to a machine, often for good reason. This allows artists to free themselves from their limitations and go further in conceptualising their pieces. Today, generative art is at the vanguard of digital art, as computers are the most widely used medium for creating art and culture. Generative systems can range from specific to generic, impacting the computational creativity community. Levels of autonomy are crucial in understanding the relationship between artificial intelligence, machine learning, artificial life, and computational creativity. Interactive systems, such as computer-assisted creativity, creativity support tools, interactivity, and human-computer interaction, can be attractive or not. Generative art and computational creativity involve systems with varying levels of interactivity, with some online and others offline. The output of a system is a key characterisation, with diversity depending on the system's generality and scope. The system

pattern of behaviour is also crucial, as it can be difficult to characterise without a complete understanding of the algorithm and parameters.

Generative Art requires artists to sacrifice control of creation for a process, often using chance operations and randomness. This process involves defining parameters that can take values within certain ranges, which are then randomly selected, and an instantiation of the artwork is completed. Randomness, or chance, is a concept significant in Mathematics and Computer Science. Accurate forecasting of genuinely random numbers is a complex task, and manual methods are possible. Mechanical methods, such as rolling a dice, can generate randomness, but they are not very convenient.

Computers have become a popular tool for producing random outcomes quickly and in a digitised format. However, humans are not good at generating randomness, making artificial means necessary to access true randomness (Mitchell 2020; 232 - 237). Probability distributions are used in simulations to capture knowledge about stochastic complex events, making them useful in modelling various things. In Visual Art we find instances of randomness in movements such as Dada, Surrealism, Abstract Expressionism, Nouveau Realism, and Fluxus as well as more recent movements such as Net Art and Glitch Art.

After the First World War, many people were angry that rationality and civilisation allowed for the carnage more than they prevented it, and many artists started to embrace chance. They used chance, accident, and improvisation to free creativity from rational control and move away from the barbarism that they just experienced. One notable instance of an artist employing the concept of randomness in the realm of early visual art can be observed in the oeuvre of English artist Kenneth Martin.

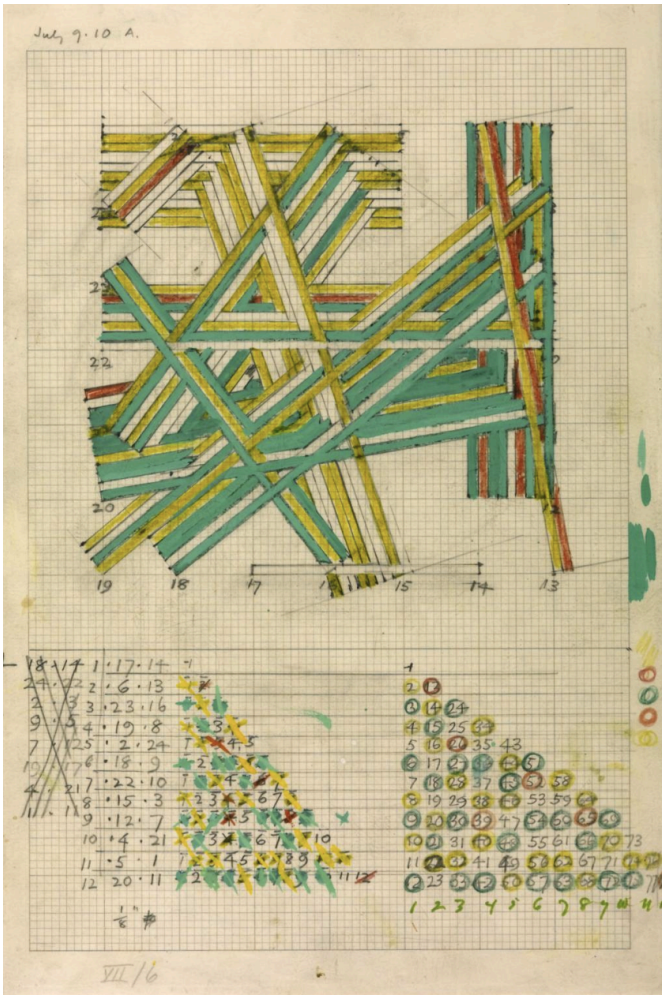


Fig 5.0: Kenneth Martin (1971). *Chance and Order Group VII, Drawing 6.* Graphite and ink.

A specific illustration of this can be found in his artwork titled "Chance and Order Group VII, Drawing 6" which is a drawing executed in the year 1971. The creation process involved

assigning numbers to the points of intersection on a grid of squares, which were subsequently recorded on small cards and selected in a random manner. A line is formed by connecting each consecutive pair of numbers as they are selected (Gale 1997).

Artificial Intelligence (AI) is a field focused on creating machines capable of performing tasks that typically require human intelligence (Miller 2019). These tasks include learning, reasoning, problem-solving, perception, and language processing. AI aims to develop machines that can independently perform tasks and make intelligent decisions. However, equating the human mind to a computer is a flawed and misleading metaphor (Searle 1990).

AI is divided into two main types: Narrow AI, which focuses on specific tasks like image recognition and natural language processing, and General AI, which aims to emulate human intelligence across various tasks (Goldstaub 2020). The concept of General AI is akin to what is depicted in science fiction, although present-day AI definitions evolve as technology advances.

Within these two main types of AI, there are several branches, including Natural Language Processing, Computer Vision, Robotics, and Expert Systems. Machine Learning, which involves training algorithms to recognise patterns and make

decisions based on data, has revolutionised many fields by allowing machines to improve their performance over time. This has transformed areas like voice assistants and recommendation systems.

AI applications are expanding across industries. In healthcare, AI aids in personalised medicine, drug discovery, and disease diagnosis. The financial sector uses AI for fraud detection, algorithmic trading, and risk assessment. In transportation, AI contributes to autonomous vehicles and route optimisation. AI also impacts virtual assistants, customer service, smart home devices, and cybersecurity. However, these advancements come with challenges and ethical considerations, such as job displacement and the need for worker re-skilling. Ensuring that AI systems are fair, unbiased, and transparent while respecting privacy is crucial.

The emergence of AI raises significant philosophical questions about the nature of intelligence and consciousness. The goal of creating machines with human-like intelligence, known as Artificial General Intelligence (AGI), prompts deep reflections on human cognition and the potential for machines to achieve genuine self-awareness and autonomy.

Throughout the 2010s, AI has been dominated by deep learning, a subset of AI that involves neural networks. Deep learning is one of many AI methods, categorised into symbolic and

sub-symbolic approaches. Symbolic AI involves human-readable symbols and rules to execute functions, exemplified by early AI programs like the General Problem Solver (Mitchell 2020). Sub-symbolic AI, inspired by neuroscience, focuses on processes underlying perception and uses complex numerical operations. Sub-symbolic AI, which includes neural networks and statistical learning techniques, gained prominence in the 2000s.

Computational creativity, a branch of AI, aims to create machines useful for creative endeavours and to expand our understanding of creativity (Du Sautoy 2019). This includes computational design in architecture and animation, where AI generates designs and creates photorealistic images. AI also produces art and music. The field evaluates theoretical frameworks of creativity from psychology and neuroscience, crucial for AI research.

In the 1960s, Joseph Weizenbaum developed ELIZA, the first natural language processing program, mimicking conversation using a simple script to identify keywords and respond with pre-written sentences (Du Sautoy 2019). ELIZA's responses, though limited, were revolutionary and significantly impacted natural language processing and AI. During the same period, A. Michael Noll and others explored computer-generated art. Harold Cohen's *AARON*, an AI “artist”, began with simple mechanisms and evolved to create increasingly complex and representational art over decades (Garcia 2019). Cohen's work highlighted the

potential for machines to exhibit artistic creativity and prompted questions about the ownership of AI-generated art.

The Painting Fool, a project by Dr. Simon Colton, aimed to create an AI system that could be regarded as a creative artist (Du Sautoy 2019). Using computational algorithms, machine learning, and natural language processing, *The Painting Fool* analysed images, generated art, and engaged in dialogue, mimicking human artistic processes. Colton's work demonstrated AI's ability to process information like an artist, influencing its creative output through elements such as dominant colour palettes.

In 2016, engineers, data scientists, and 3D printing experts developed a 3D-printed painting using data from Dutch artist Rembrandt van Rijn's works (Du Sautoy 2019). *The Next Rembrandt* utilised sub-symbolic learning and facial recognition to create a painting closely resembling Rembrandt's originals in style and composition. This project showcased the potential of training machines to recreate the style of past artists with high fidelity.

Artificial neural networks learn from examples, constructing an abstract comprehension of a topic. Given an artist's body of work, a machine can potentially acquire the painter's style and create new works appearing as if made by the original artist. However, questions arise about the authenticity of such

creations: Would Rembrandt have produced this image, or used the same materials?

The public's perception of AI's role in creative fields, particularly art, remains under-researched. Reactions to AI's contributions to music have been mixed, with David Cope's AI-generated performances facing scorn (Johnson 1997). Similarly, AI-generated artwork often lacks recognition, with preferences potentially influenced by biases rather than the art's quality. Ragot et al. (2020) found that biases against AI-produced music might skew evaluations. This research proposes that undervaluation of AI art is not due to the artwork itself but rather to preconceptions about AI. Sundar (2020) notes that people associate robots with negative attributes such as rigidity and coldness. Jago (2019) discovered that artworks believed to be human-made were rated more favourably in terms of authenticity than those known to be AI-generated. Participants viewed AI-created art as real but not reflective of the artist's ideals or essence (Jago 2019).

In 2015, Alexander Mordvintsev conceived an idea that led to developing convolutional neural networks (ConvNets) at Google. ConvNets mimic brain activities, particularly vision, by recognising objects and patterns with neurons arranged similarly to the human eye (Miller 2017). These networks can have up to thirty layers of thousands of artificial neurons, requiring extensive training with millions of labelled images.

In June 2016, Google Brain launched *Project Magenta*, exploring AI's role in creativity, particularly in music and art (Miller 2020). Project Magenta trains neural networks on large datasets of creative outputs, facilitating human-machine collaboration in artistic expression. Tools like SketchRNN allow users to create diverse designs from incomplete input, inspiring artists and aiding in rapid prototyping.

OpenAI, founded in 2015, focuses on developing AI that benefits humanity while addressing potential risks. Its early research included developing the GPT-2 language model in 2018, sparking debates about responsible AI development. OpenAI's partnership with Microsoft in 2019 combined AI expertise with cloud computing resources. Subsequent releases, like GPT-3, demonstrated AI's potential in understanding and generating human-like text but raised ethical concerns (Open AI Overview, 2023).

DALL-E and DALL-E 2, AI models by OpenAI, generate digital images from natural language descriptions. Despite their capabilities, these AI tools do not engage in true creative processes but rely on pre-existing models, often with aesthetic deficiencies. Algorithmic biases in AI systems pose significant risks, as biases can be introduced through training data or human supervision (Goldstaub 2020). Misclassifications, such as Google's 2015 photo tagging incident, highlight these dangers.

Biases in AI, particularly in facial recognition systems, lead to inaccuracies and potential harm. These systems often perform better with white male faces, misidentifying or missing non-white faces (Goldstaub 2020). Kate Crawford emphasised the need for diverse training datasets to avoid amplifying societal biases (Goldstaub 2020).

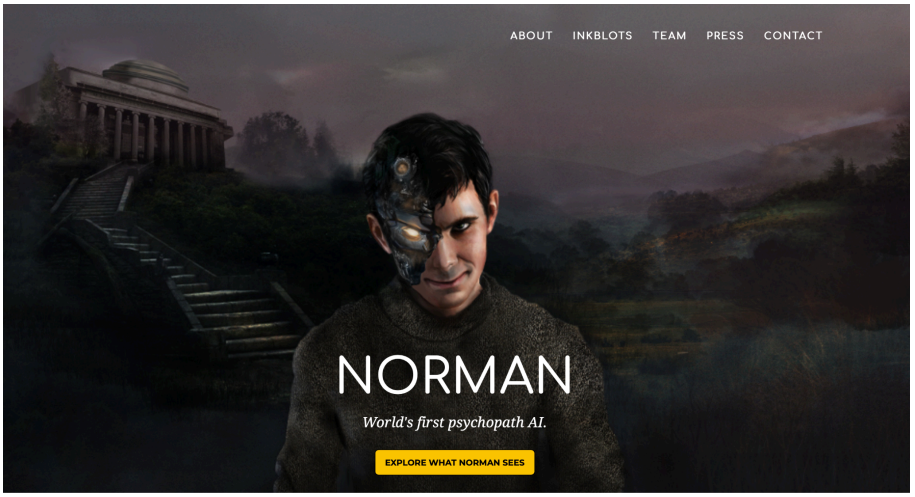


Fig 5.1: *Norman* by MIT Media Lab, 2022, Digital screenshot



Fig 5.2: *Norman* by MIT Media Lab, 2022, Digital screenshot

Norman, an AI trained on disturbing content, exemplifies the impact of biased training data. This "psychopath AI" interpreted innocuous images negatively, raising ethical questions about AI training practices and the importance of aligning AI behaviour with societal values.

General Adversarial Networks (GANs) generate data through adversarial processes, involving human discriminators to determine the accuracy of outputs. Assessing computational creativity involves comparing AI-generated products with human creativity, considering the amount of input data and the resulting artefacts. Researchers like Simon Colton and Geraint Wiggins define computational creativity as systems displaying behaviours deemed creative by unbiased observers (Colton and Wiggins 2012).

Anna Jordanous, using Applied Language Processing and statistical analysis, identified 14 components of creativity, emphasising process over outcome quality (Miller 2019). Her criteria allow for systematic evaluation of computational creativity, highlighting the importance of process in creative systems. Evaluators must ensure sample sizes are sufficient to avoid disagreements on what constitutes creativity.

In 1997, Rosalind Picard, currently a professor of Media Arts and Sciences at MIT, published *Affective Computing*, which she defines as "computing that relates to, arises from, and intentionally influences emotion” (Picard 1997). Prior to that, she

was an electrical engineer and computer scientist who believed that emotions were acceptable for entertainment but should be kept out of science and computing. Her dramatic change of direction was the result of her research into computer vision, in which she developed algorithms to enable computers to see by emulating the visual cortex using systems. Picard realised that, unlike machines, humans choose which portion of the visual field to fixate on to the exclusion of everything else. This decision was frequently motivated by emotion, such as seeing a friend's face in a crowd.

In the early 1990s, scientists viewed emotion as irrational and to be avoided at all costs (Miller 2020). Then, in 1993, Picard came across neurologists Richard Cytowic's *The Man Who Tasted Shapes*, an investigation into synesthesia, a condition in which senses appear to cross so that people associate sounds with colours, food with shapes, words with taste and textures, or experience other blending of the senses (Cytowic 1993).

Cytowic argued that multimodal perception occurs primarily in the part of the brain immediately below the cerebrum: the limbic system, which houses emotion, attention, and memory and is traditionally regarded as the brain's oldest region. Picard learned that emotion is crucial in determining what we remember and what we find fascinating. The limbic system thus contributes to unpredictability and originality. She began to understand that in

order to create a computer that could see, it was necessary to consider emotion.

Due to the impossibility of publishing an article on computer science and emotions in a peer-reviewed journal, she spent countless hours building a compelling case for affective computing and then published a groundbreaking article in *Wired* magazine (Higginbotham 2012). She is now the head of the Affective Computing Research Group at the MIT Media Lab and notes that some people already attribute emotion to computers and undoubtedly feel emotions such as anger towards their computers, which will be useful for the computer to detect.

Mathematically, if you want a computer to compose music or write a poem, you can create a programme for it, she says (Higginbotham 2012). But to enable it to experience emotions when you don't even know how your brain works is much more challenging. However, it is possible to programme a computer to simulate a specific mental state, such as pleasure.

The paradox of modern computers is that although they are capable of performing incredibly complex tasks, they lack the perception and mobility skills of even a one-year-old child (Miller 2020; 285). Moravec's paradox is named after roboticist Hans Moravec, who observed that the computational power required to perform a complex task, such as playing Go, is infinitely less

than the resource a child requires to acquire the most basic sensory motor skills.

Humans are born with an essential corpus of core knowledge—the most fundamental common sense (Spelke and Kinsler, 2007) —or acquire it very early in life. For instance, even very young infants understand that the world is divided into objects and that parts of an object tend to move together and remain part of the object even if they are concealed from view. However, it is unclear whether these are elements that a convolutional neural network could learn, even if presented with a vast collection of photographs or videos.

Psychologists have devised the term intuitive physics to describe the fundamental knowledge and beliefs humans share regarding the behaviour of objects. As very young children, we also acquire an intuitive understanding of biology, specifically how living entities differ from inanimate objects. Because humans are a profoundly social species, we develop intuitive psychology from infancy onward: the ability to perceive and predict the emotions, beliefs, and intentions of others. The phrase "barrier of meaning" perfectly captures a theme that runs throughout Mitchell's book: humans comprehend the situations they encounter in a fundamental manner, whereas no AI system possesses such an understanding. While cutting-edge AI systems have nearly matched (and in some instances surpassed) humans on certain narrowly defined tasks, they are incapable of understanding the

rich meanings that humans contribute to perception, language, and reasoning. This lack of comprehension is ingeniously disclosed by the unhuman-like errors these systems are capable of committing, their difficulties with abstracting and transferring what they have learned, their lack of common sense knowledge, and their susceptibility to adversarial assaults.

Machines can experience the actual world. *The Painting Fool* by Simon Colton meets its subjects. It recruits real individuals and evaluates the outcomes. In a similar manner, Hod Lipson's painting machines follow instructions such as the number of brush strokes and the colour schemes to use, and then construct collections of artworks in order to learn about people and things. We have not yet reached a point where we can construct robots that can coexist with us or appear indistinguishable from us, but we have already created devices that people can develop an attachment to, such as Tamagotchi. Also present are sex bots, which are now the subject of academic conferences, novels, and articles. We have established that one day machines will be able to experience the world. But will they endure suffering, one of the defining characteristics of creativity? Could they cause others to suffer? To do so, they will require emotions.

Perhaps one day there will be computers with sensors, regulatory mechanisms, and communication pathways that mimic human emotions. Later, they may surpass their human creators and develop new, inconceivable emotions. Could a

computer experience sorrow or agony in the future? It may develop an attachment to a person, mourn their touch, and experience grief when it discovers that the individual is no longer available. A computer may query while its hardware is being altered and object vehemently, perhaps even perceiving that something is about to occur based on its human operators' facial expressions. It might even defend itself in the manner of a person facing imminent mortality.

In the 1970s, Chaos Theory was first developed (Miller 2020; 20-22). Since then, it has become evident that sufficiently complex deterministic systems, such as computers, can yield unpredictable outcomes. Multiple emotion-producing mechanisms coupled with rule-based reasoning systems and continuous learning abilities result in unpredictable behaviour, as stated by Picard (Picard 1997). In other words, given a computer, emotions may affect, albeit marginally, the complexity of its concealed layers, thereby increasing the likelihood that it will exhibit the unpredictable behaviour that is an essential component of creativity. Therefore, it may independently determine to do something new. It may acquire free will. Giving such a highly advanced computer the freedom to act as it pleases, possibly motivated by emotion, could be risky.

Computers and artificial intelligence are still in the early phases of development. However, as we continue to develop increasingly intelligent algorithms, we will need to be aware of

the many undesirable characteristics that accompany intelligence and creativity. People with exceptional creativity may be unpredictable, immoral, or even outright dangerous. We will need to devise measures to ensure that a computer with some or all of the characteristics of creativity, such as the ability to introspect, experience pain, etc., does not use its acquired abilities in a manner detrimental to its creators.

Chapter Four: Speculative Futures

Artwork 4: *The Lost Echoes of Sliabh an Iarainn* Photo Series



Fig 5.3: Catherine Bourne (2023) *"I have arrived... but something is amiss"* Silver gelatin print



Fig 5.4: Catherine Bourne (2023). *The echoes of the past are in harmony with the present. Humans have vanished, and their robotic creations have long since ceased to exist.* Silver gelatin print



Fig 5.5 Catherine Bourne (2023). *Sliabh an Iarainn, where the Tuatha Dé Danann descended. Their footsteps are imprinted in this sacred land.* Silver gelatin print



Fig 5.6: Catherine Bourne (2023) *The mountain witnessed the birth and demise of civilizations. Its stoic presence guards the mysteries of time.* Silver gelatin print



Fig 5.7: Catherine Bourne (2023). *The Flashback: "What cataclysmic event befell this world? The rise of machines, the fall of humans... now only remnants remain".* Silver gelatin print

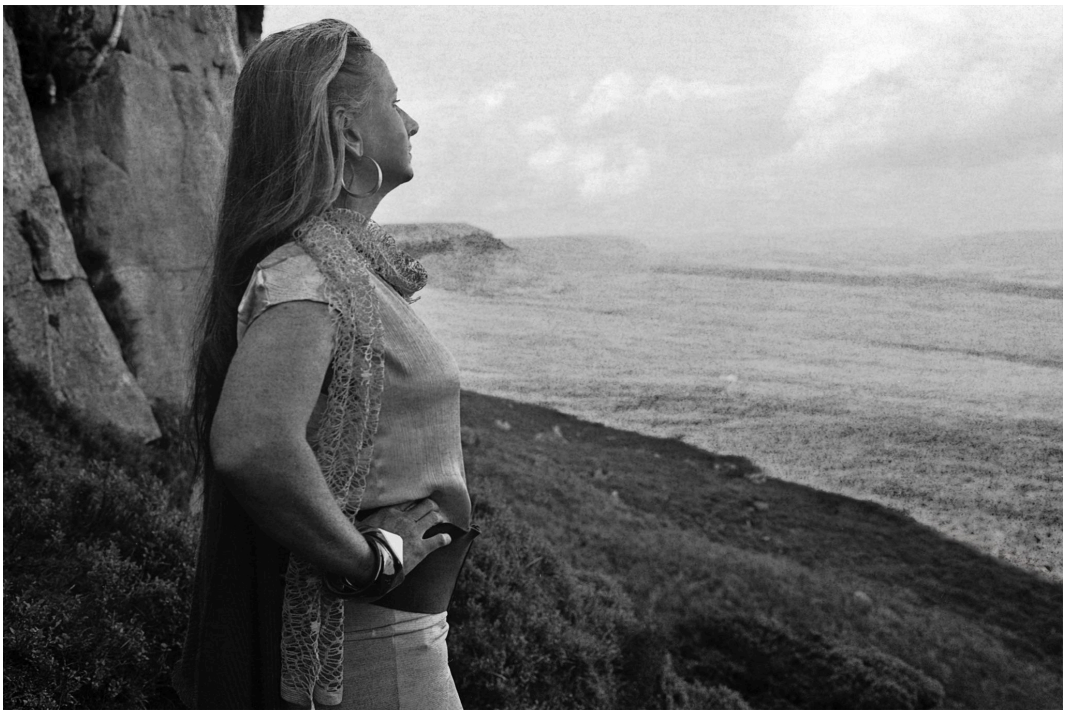


Fig 5.8: Catherine Bourne (2023) *"Though the past cannot be changed, the future can be shaped. I shall ensure a world where humanity thrives once more".* Silver gelatin print

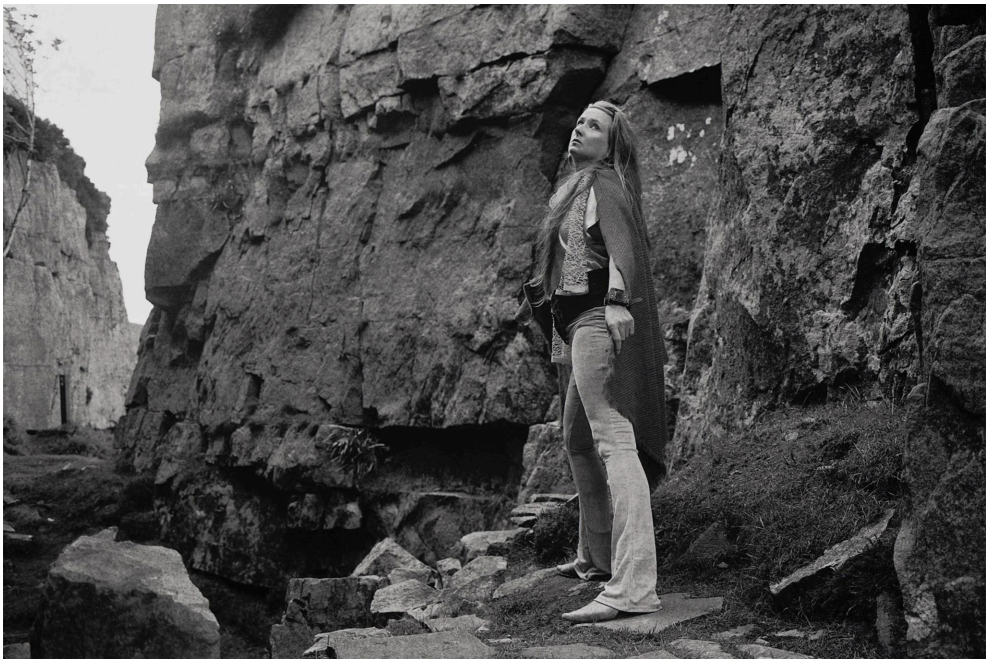


Fig 5.9: Catherine Bourne (2023). *The Departure.* Silver gelatin prin

Design

The research undertaken for this thesis allowed me to create a final series of works that exemplifies the research conclusions. I created a series of medium format, black and white analogue photographs, staged using a script written by ChatGPT. Based on the myth of the Tuatha Dé Danan and fears around The Singularity, the work is in a 60's sci-fi aesthetic, the narrative is set in a post-human world where a technology-inflicted apocalypse has occurred.

Implementation

ChatGPT Generated narrative (See Appendix for full conversation):

A Time Traveller appears as a cloud of shimmering particles in the foggy hilly region of Leitrim, Ireland, clothed in a hybrid of modern and traditional Irish clothing. The Time Traveller pauses to take in the magnificent surroundings as they are encircled by Sliabh an Iarainn's grandeur. The Time Traveller observes nature reclaiming dilapidated stone homes and overgrown gardens while passing through an abandoned village hidden between mountain peaks. She observes scattered fragments lying about on the grass. The Time Traveller muses in a voiceover about the melodic resonances of the past and present. Humans are no

longer here, and their technological inventions have long since disappeared.

When the Time Traveller arrives at a mysterious location where stones are heaped on the ground, she runs her fingertips along the stones' worn surfaces and senses a strong link to the distant past. She acknowledges quietly to herself that the Tuatha Dé Danann once descended at Sliabh an Iarainn. She can feel their impact on the hallowed land. The Time Traveller finds rusting ruins among the moss-covered rocks. She examines them and mutters to herself in recognition. The mountain, with its stoic presence guarding the mysteries of time, has seen the rise and fall of civilisations.

The Time Traveller examines old myths and traditions through a flashback, discovering the stories of the Tuatha Dé Danann, and learning about the world that once flourished here.

The Time Traveler's expression shows a mixture of sadness and determination as they return to the present. She comes to a decision for herself. She accepts with a determined whisper that while the past cannot be reversed, the future can be altered. Her goal is to guarantee that humanity once again flourishes in the world. Before passing through the portal and disappearing into the void, the Time Traveller activates her Portal Device and takes a final look back over the mountain, which seems quiet, as though it were guarding ancient secrets.





Fig 5.10: Midjourney Prompt: “black and white 60’s sci-fi image female time traveller, located on Sliabh an Iarainn”, 2022

In addition to the ChatGPT script, the selection of costumes, props and location were inspired by Midjourney outputs. The additional creation of an artefact using Midjourney, Prompt: *a mediaeval handwritten letter in latin in the style of the book of kells with the theme of artificial intelligence with text* allowed me to produce a handmade artefact as mentioned in the script for incorporation into the work.



Fig 5.11: Midjourney created AI artefact, 2022, Digital screenshot

Analysis

Artist Cindy Sherman was a key influence on the making of the work. Sherman was always interested in experimenting with different identities. As she has explained, “I wish I could treat every day as Halloween, and get dressed up and go out into the world as some eccentric character” (Waters 2012; 69). Shortly after moving to New York, she produced her *Untitled Film Stills* (1977–80), in which she put on disguises and

photographed herself in various settings with deliberately selected props to create scenes that resemble those from mid-20th-century B movies. Starting when she was only 23, these images rely on female characters (and caricatures) such as the jaded seductress, the unhappy housewife, the jilted lover, and the vulnerable naif. Sherman used cinematic conventions to structure these photographs: they recall the film stills used to promote movies, from which the series takes its title. Her *70 Film Stills* (1977-80) immediately became flashpoints for conversations about feminism, postmodernism, and representation, and they remain her best-known works.



Fig 5.12: Cindy Sherman (1978). *Untitled Film Still #8*. Silver Gelatin print.

Sherman has continued to transform throughout her career, portraying a variety of societal ideals and types in her works.

She frequently creates series and improvises on subjects like centrefolds (1981) and society portraits (2008). Her employment of theatrical effects to assume various characters is best seen in *Untitled #216* from her history portraits (1981). She makes no effort to conceal her efforts and frequently has wigs that fall off, prosthetics that are coming off, and uneven makeup. She draws attention to the fabrications' artificiality, which serves as a metaphor for how all identity-building is artificial.



Fig 5.13: Cindy Sherman (2010). *Untitled.* C-Type print.

Sherman has always been more drawn to the grotesque than the glamorous characters she occasionally plays. In the 1980s and 1990s, series like *The Disasters* (1986–89) and *The Sex Pictures* (1992) exposed viewers to the bizarre and repulsive sides of humanity through graphic, explicit imagery. She said in 1986, "I'm disgusted with how people get themselves to look beautiful; I'm much more fascinated with the other side,"

(Frascella 1986; 49). Her research of the grotesque and the numerous forms of violence that may be done to the body was made more poignant by the news reports of sick bodies that were at that time painfully visible due to the AIDS crisis. The visual shorthand we use to categorise the world around us is subverted by Sherman in these series and throughout the entirety of her body of work. She highlights the artificiality and ambiguity of these preconceptions and casts doubt on their suitability for comprehending a much more complex reality. In recent years Sherman has been creating work on Instagram that continues her experimentation with notions of identity through the more direct format of the selfie. While Sherman still utilises costume to create the characters featured, they have the sense of being more immediate, and lacking the detailed backstory of her previous creations. Interestingly the format of Instagram allows others to propose personality traits and histories via follower comments.

Stylistically, Chris Marker's film *La Jetée* (1962) was also a key influence on the making of the work. The film defies traditional cinematic conventions by utilising a series of still images to provide narrative. Through its innovative use of black and white photography, *La Jetée* unveils the poetic and narrative power inherent in the still image, immersing the viewer in an exploration of memory and time. The film tells the story of a post-apocalyptic world through a sequence of stills, each

photograph is carefully composed, laden with symbolism and rich visual details, inviting the audience to actively engage with the narrative and fill in the gaps between the images, potentially creating a sense of co-authorship or at least immersion in the viewer. The deliberate use of still images heightens the sense of temporality and the exploration of memory. The frozen moments captured in each photograph become fragments of memory, frozen in time. The absence of motion in the film allows the audience to linger on each image, encouraging contemplation and reflection. As the narrative unfolds, the images elicit a deep sense of nostalgia and longing, evoking a connection to and investment in the protagonist's journey.

La Jetée's time traveller protagonist is not selected for the mission due to any particular skill or heroism. It's his fixation on images – a singular image from the past – that qualifies him for the role. The process is not entirely psychological, though. He's injected with a mysterious drug and collapses physically; his body is still situated in the present, but it seems necessary to demobilise him as if his consciousness is tied to his body but also independent of it. The preoccupation with trauma performed by authoritarian scientists amid wider societal havoc makes an implicit reference both to the horrors of WW2, the threat of nuclear apocalypse during the Cold War, and the unsettled colonial relationship between France and Algeria. Subtle details, such as the subterranean population, also evoke

Freudian conceptions of the unconscious of a traumatised individual and society (Kawin 1882; 15-20).

Is there not an intrinsically weird dimension to the time travel story? By its very nature, the time travel story, after all, combines entities and objects that do not belong together. Here the threshold between worlds is the apparatus that allows travel between different time periods — which may be a time machine, or which could actually be a kind of time-crossing door or gate — and the weird effect typically manifests as a sense of anachronism. But another weird effect is triggered when the time travel story involves time paradox(es). The time travel paradox plunges us into the structures that Douglas Hofstadter calls "strange loops" or "tangled hierarchies", in which the orderly distinction between cause and effect is fatally disrupted. - Mark Fisher, The Weird and the Eerie (2016)

The influences of Sherman and Marker were sublimated into the framework of Cosmism as an aesthetic device. Cosmism encompasses a collection of theories and endeavours, spanning the realms of philosophy, art, and science, which draw inspiration from the works of the philosopher Nikolai Fedorov (1829-1903). This amalgamation encompasses the discourses of Marxism, Orthodox Christianity, Enlightenment, and Eastern philosophy. Moreover, this encompasses notions of technological immortality, resurrection, and space exploration, while also contemplating the potential realisation of

these concepts through artistic, social, and scientific methodologies.

The philosophical movement known as Cosmism originated during the latter part of the nineteenth century and underwent further development during the 1920s and 1930s, as a subsequent generation endeavoured to realise the vision put forth by Fedorov. The movement advocates for critical perspectives that embody a sense of optimism in response to the widespread erosion of rationality. The appeal of the aforementioned concepts emerged among individuals who were actively seeking a society devoid of social classes, advancements in the field of space exploration, and methodologies for achieving immortality following the events of the October Revolution in 1917.

The objective of Cosmism is to transcend the limitations of time and space by engaging in collaborative and innovative efforts that strive for a universalism that goes beyond the human realm. The aforementioned movement serves as a precursor to contemporary ideologies like transhumanism, which focuses on the augmentation and revitalisation of the human body through the utilisation of biological and technological prosthetics, artificial intelligence, and genetic manipulation. We might find examples that address these concerns in the novel *Red Star* (1908) by Alexander Bogdanov which describes a fictional society on Mars where genetic research and a computerised

administration of a worker population is described (Edwards, C. 2019 p. 381).

Cosmism undermines scientific rationalism by proposing a merger with the mystical and material being. Jose Alaniz, Professor of Literature in the University of Washington, notes that one of the functions of Cosmism was to help us “understand where human beings are headed in their technological, ideological, biological, and spiritual relationship to the world they inhabit” (Alaniz, 2014; 674-678).



Fig 5.14: Ilya Kabakov (1984). *The man who flew into space from his apartment. Mixed-media installation.*

In his book *Ilya Kabakov: The man who flew into space from his apartment* (2006), Boris Groys links Russian Cosmism and the fear of a technocratic future in his analysis of the work by Ilya Kabakov (Groys 2006). The fictional hero of this work from 1984 is a loner with an unattainable dream: to travel by himself in cosmic space. However, this fantasy is also an appropriation of a larger Soviet agenda and the associated official Soviet propaganda. The hero appears to fly through the roof of his dingy bedroom and ascend to space after creating a homemade catapult. The dismal room and the crude catapult hint at the reality hidden behind the Soviet paradise, where the political mission of the Communist revolution and cosmic vision are considered as inseparable. Interestingly, documentation images of the installation look uncannily like AI generated images, a reflection on how quickly we have come to suppose strange, other-wordly, magic realist, and other imagery as digitally created, the huge effort needed in creating such installations of material-based tableau being mistaken for prompts fed into a computer.

This leads to a key question raised by my process, the importance (or not) of the prompt. AI utilises prompts given to it to generate art through a structured and dynamic process that involves several key steps. When an artist inputs a prompt into an AI system, this prompt serves as the initial seed or instruction that guides the AI's creative process. First, the AI

interprets the prompt by analysing the text for relevant keywords, themes, and contextual clues. This interpretation process helps the AI understand the desired direction, style, or concept that the artist wishes to explore. For instance, if the prompt describes a serene landscape at sunset, the AI will identify elements such as "serene," "landscape," and "sunset" to inform its generation process. Next, the AI leverages its training data, which consists of vast amounts of pre-existing images and artistic works, to draw inspiration and reference points. The AI uses sophisticated algorithms, often based on neural networks like Generative Adversarial Networks (GANs) or Variational Autoencoders (VAEs), to synthesise new images. These neural networks have been trained on extensive datasets, allowing them to understand and replicate various artistic styles, techniques, and compositions. During the generation phase, the AI combines the prompt's guidance with patterns and styles learned from its training data. It generates multiple variations and interpretations of the prompt, experimenting with different compositions, colour schemes, and artistic techniques. This process is iterative and exploratory, with the AI constantly refining its output to better match the prompt's requirements.

The AI's ability to generate art is also influenced by parameters set by the artist, such as the desired level of detail, the complexity of the composition, or the stylistic preferences.

These parameters help further tailor the AI's output to align with the artist's vision. As the AI produces these variations, the artist can review and select the most compelling or suitable outputs. This review process allows the artist to provide additional feedback or adjustments, refining the prompts or tweaking parameters to hone the final result. The iterative nature of this process enables a dynamic collaboration between the artist and the AI, blending human creativity with machine-generated possibilities. Ultimately, the prompt acts as a crucial directive that shapes the AI's creative process. By providing a clear and detailed prompt, the artist can guide the AI to produce images that are not only technically proficient but also potentially rich in conceptual meaning and aesthetic appeal. Through this interplay of human input and machine generation, AI can create innovative and diverse artworks that push the boundaries of traditional art forms.

Michael Filimowicz in *Concept Craft: a Poetics of AI Art* (2023), argues that his AI-based arts practice can be defined within performative theory. Performative theory is an approach in the humanities and social sciences that highlights the performative nature of language, discourse, and social behaviours. It is sometimes referred to as the performative shift or performative paradigm. It acknowledges that theory itself can actively influence and construct reality, going beyond simply explaining or interpreting occurrences. Performative theory, or the performative turn, focuses on the idea that language and

discourse do more than merely describe or report reality—they actively participate in shaping it. Originating from J.L. Austin's concept of speech acts, performative theory posits that utterances can enact or bring about certain realities.

Within the framework of performative theory, co-creating artistic products through the use of generative AI tools might be considered performative. Rather than only witnessing or evaluating AI art, the artist is actively involved in its production and influenced the conversation surrounding it. Filimowicz argues that he uses

… generative AI technologies as a medium to interact and perform with the material. Authorship and expertise are being challenged by the usage of generative AI techniques. I challenge the notion of the author's exclusive authority by working with AI and adopt a cooperative, co-authored strategy instead. This raises questions about long-standing power structures and creates new avenues for artistic and information production. The poetics of AI art may be said to be embodied in the instruments used in generative AI. They create, work with, and alter data in order to produce fresh artistic interpretations. I am actively engaged in the practice of AI art as well as describing and analysing its poetics by using these tools throughout my co-authorship of the theory. The process of creating material utilising AI tools is fundamentally similar to the topic I am theorising about (Filimowicz 2023).

While this argument is compelling, it does not fully align with the fundamental principles of performative theory as articulated by key theorists such as J.L. Austin and Judith Butler. Performative theory emphasises the capacity of language and actions to not only describe but also create social realities through intentional, contextually embedded acts.

Filimowicz goes on to proposed that theory and practice become more reflective when co-authored through the use of generative AI techniques:

By establishing a comparison between the careful creation of ideas and the skillful craftsmanship of an artisan, thinking as a handicraft, on the other hand, highlights the purposeful and artisanal features of creative thought. The connection between these ideas is the understanding that creative work requires both the creative and transforming potential of poetry and the intentional and skillful thought of a craftsman (Filimowicz 2023).

I would argue that AI systems, including those generating art or text from prompts, operate based on pre-defined algorithms and datasets. The outputs they produce are not original creations but recombinations of existing data. Unlike human creativity, which can produce genuinely novel ideas, AI relies on patterns and precedents found in its training data, there is an absence of intentionality. Edmund Husserl's concept of

intentionality, central to his phenomenological theory, underscores the unique aspect of human consciousness that distinguishes it from machine experience. According to Husserl, consciousness is inherently intentional, always directed towards something with specific meanings and purposes. For instance, perceiving a red cup is not merely a visual sensation; it is experienced as a cup for drinking, imbued with function beyond its physical properties. This act of meaning-making, the directedness of consciousness, is fundamental to human experience (Williams 2024).

In contrast, while AI can be programmed to achieve specific goals and respond intelligently, it does not equate to human intentionality. AI systems process information, learn, and adapt, but they lack the subjective meaning-making intrinsic to human experience. Their "intentionality" is limited by their design and training data. They can identify a cup, but they do not experience it as a cup for drinking as humans do. The prompts given to an AI system merely trigger automated processes devoid of personal intention or emotional depth, where artistic creativity involves a process of exploration, iteration, and refinement, where the artist interacts dynamically with their medium, learning and evolving through the act of creation. AI prompt input lacks this processual engagement, reducing the creative act to a single moment of input rather than an ongoing dialogue between the creator and the medium. While AI prompt

input can generate aesthetically interesting or technically impressive outputs, it lacks the core elements that define creativity and art-making. However, the overall process combined with material outcomes represents a new form of generative collaboration and material thinking, where the artist's intentionality and creative vision remain central to the production of unique, contextually enriched artworks, distinguishing it from the original isolated AI-generated content and imbuing it with unique artistic value or, arguably, its aura.

Speculative Futures: Discussion

You can't connect the dots looking forward; you can only connect them looking backwards. So you have to trust that the dots will somehow connect in your future - Steve Jobs (2005)

So far, this thesis has examined definitions of creativity, how computers can be used as a tool for creativity, and whether or not computers are capable of creativity autonomously. We have established that while computers are unable to be autonomously creative as we understand the term, they will get better and better at assisting us with creating outcomes and how even by failing they can generate new ideas and creative inspiration. I will now look at various themes relating to technology, computers, and AI that can *inspire* us to be creative, using ideas and phenomena associated with computers from the mid-20th century to today, in the context of my own creative practice.

Glitch Art encompasses the deliberate production or manipulation of digital or analogue glitches, mistakes, and artefacts in visual, auditory, or video material. In order to produce artistic effects and test the limits of technology, it embraces flaws, errors, and disruptions in digital or analogue systems. Images that are warped or corrupted, audio loops, visual noise, data bending, circuit bending, and software manipulation are only a few examples of glitch art. To create their intended glitch effects, artists may use a variety of approaches, including editing code,

causing data mistakes, and exploiting hardware/software flaws (Barnhart 2022).

The aim of glitch art is frequently to question prevailing beliefs about the smoothness, accuracy, and perfection of digital media. It encourages viewers to question the dependability and stability of digital systems by celebrating the unpredictableness, randomness, and beauty found in mistakes and malfunctions. Glitch art is frequently seen as a subversive and experimental approach to visual and auditory aesthetics and can arouse feelings of nostalgia, bewilderment, and fascination. The Cubism movement of the early 20th century made famous by painters like Pablo Picasso and Salvadore Dali, served as an inspiration for the glitch art movement, which later gained popularity in the music and art scenes of the late 1970s and became a common theme in design. The art collective JODI founded by Joan Heemskerk and Dirk Paesmans, developed the "net.art" movement, which was one of the earliest manifestations of glitch art (Stallabrass 2003; 49–72) and was well-known for employing error messages and technological hiccups as a type of Glitch Art on their website. Databending and datamoshing, two subsequent Glitch Art techniques, were influenced by this. For instance, artists frequently utilise steganography, a technique to attach parts of a file to the background noise of, for instance, a jpeg image, to assure secret communication over the internet. Glitch art has become accepted in the world of contemporary art and has been displayed at galleries, festivals, and online galleries for

digital and new media art. Many artists use existing material to produce glitch art, taking and reusing it to create novel and surprising versions of well-known visuals and sounds (Barnhart 2022).

In direct response to Jacob's ‘tinkering’ metaphor regarding innate creativity (Jacob 1977), artist Joe Davis, who initiated the practice of biohacking before it was formally recognised, employed different forms of a gene derived from the orange puffball sponge to fabricate electronic circuits (Hauser 2019). Typically, this particular gene is responsible for encoding the protein known as silicatein, which is responsible for the formation of the glass skeleton found in puffball sponges. However, in the adapted iteration utilised in Bacterial Radio (2012), it facilitates the metabolic process of extracting metals from the surrounding environment (Davis 2012; 110-113). The bacteria that have undergone genetic modification are capable of forming conductive radio circuits, albeit in a manner that is anachronistically analogue. Davis employs a figurative interpretation of circuitry in the field of synthetic biology, which results in an unexpected outcome. Paradoxically, he utilises biological principles to manipulate electronic engineering, as opposed to the conventional approach of applying engineering principles to biology (Hauser 2017; 10).

I am interested in *failure* as a theme and creative device in art making. Artists have deliberately utilised the theme of failure to suggest a resistive perspective of the world, whether by celebrating broken promises and myths of the avant-garde or by attempting to accomplish projects that appear insurmountable. Success is intentionally undervalued, uncertainty is welcomed, experimentation is encouraged, and risk-taking is seen as a legitimate tactic here. The difficulties of physically realising artworks—battling with ideas, representation, and object-making—add to the abstract possibilities made possible by failure. Artists have looked for novel, surprising methods to open up endgame circumstances, ranging from the ideological shadow of the white cube to unfulfilled promises of political freedom, by exaggerating both theoretical and practical failure. There is a tension between the two subjective poles of success and failure, where paradox governs and orthodoxy is rejected. Failure pinpoints ideas that have rejected consensus and chosen to focus on problems rather than solutions.

Many… artists work precisely towards the unattainable, using processes of trial and error, which are then visible in the artworks themselves. By doing so, they stress the crucial importance of research and experimentation as productive artistic routes. According to [Head of Sculpture Studies at the Henry Moore Institute, Lisa] Le Feuvre, these procedures stimulate possibility in the very gap between intention and realisation. Additionally, the playful dimension that is embraced reinforces the artistic

pleasure associated with the act of failing: things are usually funnier when they do not work so well, and can therefore become absurd or unexpected. In these kinds of unsuccessful projects, failure accentuates the importance given to elements of artistic practice, such as exploration or discovery. At the same time, it also points back to childhood, where not succeeding is vitally integral to processes of development and learning. For all these reasons, such an understanding of failure still comprehends a seductive idea of progression (Martins 2015).



Fig 5.15: Bruce Nauman *(1966) Failing to Levitate in the Studio.* Performance.

Bruce Nauman's seminal work *Failing to Levitate in the Studio* (1966) exemplifies how artists frequently set themselves a variety of impossible tasks. Such is also the case with John Baldessari's ball series (*Throwing three balls in the air to produce a straight line*, or *Throwing four balls in the air to form a*

square, both 1973), in which each shot repeatedly and purposefully catches a lighthearted moment of non-achievement.

My own work *You Didn't Kill The Dinosaurs* (2014) plays with failures in communication and cultural projection. It was devised on a visit to Ostrobothnia, Finland, which has a famous meteor impact site "Söderfjärden". I fell into conversation with a local who explained that the meteor impact was that which “killed the dinosaurs”. Subsequently, I decided to film a mock documentary at the meteor site and it was only after constructing dinosaur costumes and explaining my intentions upon returning to the area that I was informed that the person who had initially explained the site's history had been joking. At this point I decided to go ahead with filming a fictional account of the site’s history, in a 1970's educational video formal and aesthetic, as a means of wryly accepting my own failure in understanding (and rigour in research).



Fig 5.16: Catherine Bourne (2014). *You Didn't Kill The Dinosaurs*. Digital colour print.

As discussed in the Framework section, I have consciously chosen to not include themes of posthumanism, transhumanism, and other techno-biological processes within my research. However, I will briefly discuss biohacking here as it pertains to my current art and technology practices..

A central theme in the intersection of the body and virtual space is the exploration of Transhumanist or Biohacking interventions within art practice, with artists like Stelarc and Neil Harbisson serving as key figures. Jens Hauser, in *Art Between Synthetic Biology and Biohacking: Searching for Media Adequacy in the Epistemological Turn* (2017), contends that these methods align

with art historical paradigms of creation, emphasising their closeness to life and the blending of technologisation and animation of the animate. This convergence raises ethical questions and invites comparison with AI art, particularly in their direct bodily involvement versus AI's more detached nature.

Bio Art, as defined by Herath, Kroos, and Stelarc (2016), advocates for creating artificial, dynamic ecosystems inspired by biological processes, contrasting with traditional uses of organic materials in art. This genre involves artists utilising 'biobricks'—standardised genetic building blocks—to introduce new functionalities into organisms, imbuing them with contextual and aesthetic elements, exemplified by projects like Daisy Ginsberg and James King's *E. chromi* (2009) and Tuur van Balen's *Pigeon d'Or* (2011). These works engage deeply with the ecological and societal implications of biotechnology, often blending humour and subversion.

Stelarc, an Australian performance artist, explores the boundaries of human embodiment through technology. His works, such as *Third Hand* (1980-1998) and *Ear on Arm* (2006-), investigate the hybrid nature of the human body, challenging traditional notions of identity and perception (Herath, Kroos, and Stelarc, 2016). These provocative performances prompt debates about the future of human embodiment and the ethical frontiers of technological integration. Neil Harbisson, recognised as the world's first officially acknowledged cyborg,

embodies the fusion of human and technology through his "eyeborg" device, which translates colour frequencies into audible vibrations, extending his sensory capabilities (Danaher, 2019). His work, along with the establishment of the Cyborg Foundation, advocates for the creative and perceptual augmentation of humans through cybernetic extensions.

The discomfort towards artistic biohacking interventions, despite their parallels with medical biohacking, often stems from their experimental nature and the challenge they pose to traditional boundaries of bodily autonomy and identity (Herath, Kroos, and Stelarc, 2016). These practices are perceived as less essential and more controversial than medically guided interventions, contributing to societal scepticism and ethical debates.

Despite these explorations highlight the transformative potential of biohacking and biotechnology in art, pushing the boundaries of human experience and challenging our understanding of life and creativity in the age of advanced technology, the historical context of these types of interventions and experiments on minority groups also plays a significant role in shaping societal attitudes and concerns regarding biohacking interventions. The history of unethical medical practices, such as forced sterilisations, eugenics programmes, and other forms of exploitation and experimentation on marginalised communities, has understandably created deep-seated mistrust and scepticism towards any interventions involving the human body. This

exploitation and mistreatment of minority groups in the name of science and progress has left a lasting impact on collective memory and perceptions (Schmeink 2016; 38). This legacy highlights the importance of ethical considerations, informed consent, and protecting the rights and autonomy of individuals when engaging in any form of biohacking or technological bodily interventions, and underscores the need for rigorous ethical frameworks and regulations to ensure the responsible and equitable implementation of biohacking technologies and practices.

Contemporary artistic speculations about the future of humanity and the definition of 'human' consider the limits of broadly understood humanity as the central problem, as well as the possibilities and consequences of crossing them (Herath, Kroos, and Stelarc 2016). The work of Kevin Warwick, a Professor of Cybernetics at the University of Reading in the UK, is one of the most well-known examples of advancement in cybernetics experiments. In order to track his movements and remotely control appliances like doors, lights, and other computers, a relay chip was inserted in his forearm as part of the *Cyborg 1.0* (1984) project. In order to activate the neural interface, the second experiment, *Cyborg 2.0* (1985), required the neurosurgical insertion of hundreds of electrodes into his left arm. Thanks to this, Warwick was able, among other things, to operate an artificial hand equipped with the sense of feeling and, by

connecting to his wife's nervous system, to sense some of her movements. The scientist said that after training the brain, he gained previously non-existent senses (Warwick 2019).

Donna Haraway's famous *A Cyborg Manifesto* (1985) essay explores the intersection of technology, gender, and identity. It challenges traditional binary oppositions between human and animal, man and woman, and nature and culture. Haraway proposes the concept of the cyborg, a hybrid creature that combines human and machine, nature and culture, and man and woman (Haraway 1985) This concept represents a new way of thinking about identity and power, rejecting traditional notions of purity, authenticity, and hierarchy. Haraway uses the cyborg as a lens to examine social and political issues, such as technology's transformation of the workplace and gender roles. She also proposes a new politics based on affinity, a mode of connection that focuses on shared interests, experiences, and desires, potentially creating new forms of political agency and challenging traditional hierarchies.

In Alex Garland’s film *Ex Machina* (2014) the Turing Test, and its successful completion by a female Artificial Intelligence, plays the pivotal aspect to the love story or as it turns out sexual (non) relation between the male human and the ‘female’ AI. What is of interest in this particular narrative is that the consistent popular understanding of how we define AI is where a human interacts

with a computer, and if the human can't tell that it's a computer they're intersecting with they've passed the test. *Ex Machina* depicts a testing process closer to Alan Turing's original proposal, in which the machine passes if it can convince a human it is not just human, but specifically *female*.

Cyborgs combine biological and artificial components, enhancing the capabilities of a living organism, typically a human (Herath, Kroos, and Stelarc 2016). Robots, on the other hand, are autonomous machines created from mechanical and electronic components, designed to perform tasks without human intervention. Unlike cyborgs, robots do not have biological components or possess a biological identity. They are mechanical or electronic entities programmed to perform specific functions or tasks. Robots can come in various forms, ranging from humanoid robots that resemble humans in appearance and movement to specialised robots designed for specific purposes, such as industrial automation, exploration, or companionship.

The representation of robots in 20th-century media was far-reaching, specifically in film, and fall into two key categories: Benevolent: those emotively aimed to elicit sympathy such as *Star Wars*' C3P0, Disney's *WALL-E* etc. all presented an innocent, quizzical curiosity, and benevolence—there was a sentimentalised logic to their creation. The second category were Malevolent. Characters such as Dr. Who's Daleks who over the course of the series' narrative arc transpired to me a

human-robot interface deliberately designed by a ‘Dr Frankenstein’-like creator to not have empathy as this was the means for them to achieve a ‘triumph of the will’ by enslaving the universe. In doing so they ended up destroying their creator and becoming autonomous (but no less malevolent). Other famous sinister robots include Ash, an antagonist of the 1979 sci-fi horror film *Alien* who serves as the spaceship's science officer, but it is later revealed that he is actually an android who is intent is making sure that the alien onboard the ship itself would be brought by him to the company, even at the expense of the ship's crew (Villains Wiki 2023), and HAL 9000, the seemingly omniscient computer in the 1968 film “2001: A Space Odyssey,” who was the film’s most expressive and frightening figure, and made a lasting impression on our collective imagination (Flahive 2018).

In *Robotics and Art, Computationalism and Embodiment* (2016) Simon Penny discusses why this forefronting of motivation in robot characters is key to our engagement with their narratives:

Robotics implies the design of modalities interaction, and the necessity for a theorisation of such. But more importantly, it encompasses that field in a larger territory—the aesthetics of behaviour. Robots live in the world and must survive by their ‘wits’—the effectiveness of the decisions they make on the basis of the data they collect via their sensors—and success is

pragmatically measurable by the normal criteria of engineering: efficiency, optimality, speed, safety, survival (Penny 2016).

People have been contemplating ‘machine morality’ for as long as they’ve been thinking about robots. Probably the best-known discussion of machine morality comes from Isaac Asimov’s science fiction stories, in which he proposed the three *Fundamental Rules of Robotics* (Asimov 1950):

1. A robot may not injure a human being, or, through inaction, allow a human being to come to harm.

2. A robot must obey the orders given to it by human beings, except where such orders would conflict with the First Law.

3. A robot must protect its own existence as long as such protection does not conflict with the First or Second Law

Asimov wanted to demonstrate how such a system of laws would invariably fall short. The 1942 short story *Runaround*, in which Asimov first described these laws, describes a scenario in which a robot, acting in accordance with the second law, moves towards a hazardous substance. When the third law then takes effect, the robot moves away, but this causes the second law to take effect once more, trapping the robot in an endless cycle that threatens the robot's human controllers (Asimov 1950). Robots' unforeseen effects from having ethical norms programmed into them were a common theme in Asimov's stories. As we've seen, the issue of incomplete rules and unexpected consequences has

crippled all rule-based AI systems, and moral reasoning is no exception. Asimov was right to predict this (Mitchell 2020; 184-5).

There is something quaint about 20th century depictions of non-biological robots, specifically in their materiality. The 1991 film *Terminator 2: Judgement Day* was the first mainstream use of CGI to depict a robot (T-1000) who could morph into different shapes using a 'liquid metal' like effect. The actor, Robert Patric, utilises an uncanny, robotic physicality to indicate to the viewer that the character is not quite human.

The definition of 'uncanny' is understandably vague, as are many such words with powerful emotional attachment - '"beyond the ordinary or normal' ' and "uncomfortably strange" do not begin to capture the true spirit of the word. There is a skin-crawling, not-quite-repulsive, impractically fearful state associated with the emotion that is impossibly complicated and wholly lost in the translation to language… it surges when a mechanical process juxtaposes with the ordinary imperfection of human life (Diels 2014).

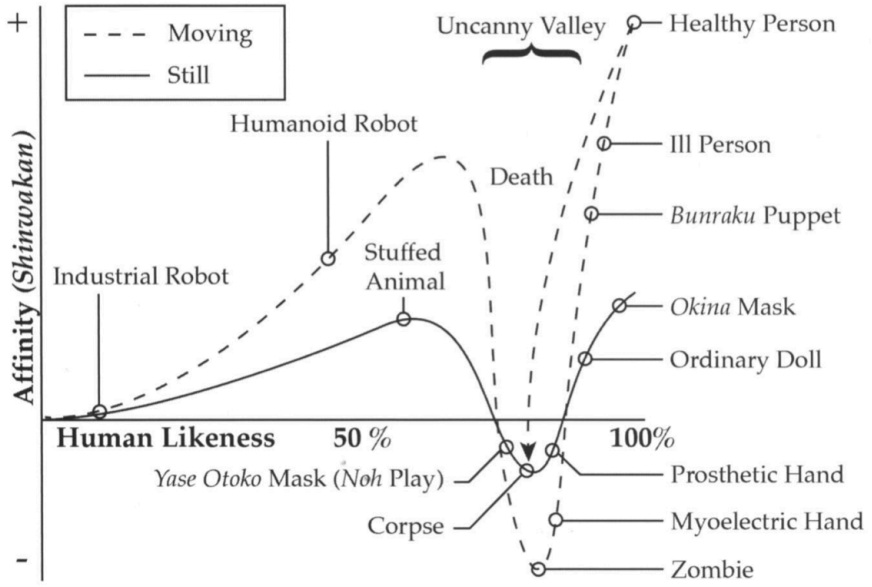


Fig: 5.17: Mori Mashiro, *Uncanny Valley,* 1970

Uncanny Valley refers to Mori Masahiro's 1970 theory illustrated in graph form of human empathy towards robots. The valley is the dip where humans are repulsed by the robots' similitude with humans (Diels 2014).

One non-technological illustrative instance is provided by Freud, who posits that epileptic seizures and manifestations of insanity evoke a feeling of the uncanny due to their capacity to incite in the observer the sensation that concealed beneath the ordinary semblance of animation are automatic, mechanical processes (Freud 1919).

My photographic series *The Inhabitants* (2009-2012) explored the visual language of the grotesque, attempting to isolate in still

imagery a sense of the uncanny. The work references classical portraiture, Mannerism, spirit and occult photography and Dust Bowl-era documentary photography. In the images and films corporeal spaces, existing outside of time and geography, are depicted. In these places, mutations and monstrous physical transformations occur. The work is concerned with both the abject and the phantasmagorical. These phenomenological occurrences imply an undoing of the psyche, one that is both sinister and difficult to quantify.



Fig: 5.18*:* Catherine Bourne, *The Inhabitants,* 2009- 2012,
Giclee Prints.

The Grotesque as a term first appeared in the mid-sixteenth century to describe phantasmagorical imagery adorning the walls of an excavated Roman Villa, misrepresented as ‘grottos’ as they were subterranean (Penn Warren 1997; 209). A grotto is a powerful metaphor for the human body, its functions, and its potential for disfigurement. These natural and man-made caverns can be lumpen, mottled, and ugly, as well as (but less often) sublimely beautiful. They are dark and dank; they putrefy and collapse into themselves, at best evoking womb metaphors; at worst, the internal structures resemble diseased flesh. The

grottos exemplify structural exaggeration and distortion, challenging the harmonious, linear norm. In Rabelais and His World: Carnival and Grotesque (1984), Mikhail Bakhtin evocatively explains the tangible similarities between the grotto and the grotesque forms:

"The artistic logic of the grotesque image ignores the closed, smooth, and impenetrable surface of the body and retains only its excrescences (sprouts, buds) and orifices, only that which leads beyond the body's limited space or into the body's depths. Similarly, it ignores the closed, smooth, and impenetrable surface of the landscape and retains only its excrescences (outcrops, tors) and orifices, only that which leads beyond the limited space of the polis and the oikos or into the earth's depths, into the underworld and the depths of the 'jungle' (rainforest) and the 'swamp' (wetland) (Bakhtin 1984, 317–318).

While art that we call grotesque possesses certain general characteristics, the designation is always embedded in discourse. For instance, attributes of the adjective *grottesche* entered sixteenth-century continental European descriptive vocabularies to describe aspects of the visual arts, while concurrently, the word anticke was being used in England to describe the same phenomenon (Brown 2007; 7). Antickes in art were monstrous but frivolous forms, not 'taken seriously' by theoreticians (Barasch 1971; 61). The post-reformation culture dominant in England at this time rejected their use, seeing them

as fantasies that perpetuated superstition. Also at this time in England, a connection between grotesque and caricature began, particularly in a spectatorial context (Bailey 1700) as a continuation of the populist mediaeval traditions of drolleries in the border decorations of illuminated manuscripts (Gombrich 1984;321),) combined with exaggerated, misshapen features being increasingly used as a means of satirical entertainment in the popular press (Hannoosh 1992; 81).

In comparison to the grotesque, *Abjection* subverts the optimism of this proto-modernist movement by substituting hope and awe with crushing futility. Abjection borrows from the sublime the idea that we are dwarfed by things greater than us (such as a higher power, the natural world, or the purpose of existence). Abjection is a process that disturbs identity and order because it does not respect boundaries, positions, or rules, according to Julia Kristeva's definition from *The Powers Of Horror: An Essay on Abjection* (Kristeva 1982). The ultimate abjection is the corpse, which “becomes quite simply the preeminent emblematic property” of the abject (Benjamin 1928). The combination of internal ideas (fear, pathos) with fearful, disgusting aesthetic principles, the terror of an undoing’ (literal or metaphorical), becomes the primary sense. Therefore, it could be argued that the Abject and the Grotesque meet at the border (the grotesque being boundary-violating). This raises the question of whether or

not we have redefined our understanding of these terms in the modern age.

There are several reasons why much of the art produced using AI tends to be weird, grotesque, abject, or terrifying. One reason is that AI is often trained on large datasets that include a wide range of images, some of which may be disturbing or unsettling. As a result, as seen in my experimental etchings, the AI may produce images that combine elements from various sources in unexpected and occasionally disturbing ways. Another reason is that AI algorithms are often designed to optimise for certain features, such as sharpness, contrast, or colour saturation. When these algorithms are applied to images, they can sometimes create images that are distorted or exaggerated, which can contribute to their grotesque, or Uncanny Valley quality.

Many artists who work with AI are interested in exploring the boundaries between human and machine creativity, and in challenging traditional notions of authorship and artistic agency. By creating images that are unsettling, these artists are able to push the limits of what we consider to be art and what we consider to be "human." The terms "grotesque," "abject," and "sublime" are often associated with the body and the natural world, and they reflect deep-seated human emotions and experiences that are difficult to quantify or replicate using AI. However, it is also important to note that AI can be programmed

to recognise and respond to certain aesthetic features or patterns, even if it does not have the same emotional or experiential context as a human viewer. AI algorithms can be trained to recognise certain patterns in images, such as colour or shape, and to generate new images that conform to those patterns. While the resulting images may not have the same emotional impact or cultural resonance as a human-created work of art, they can still be aesthetically interesting and visually compelling.

Another key term from art theory that is of interest to my practice and this research is *Seduction / Repulsion*, which explores the ways in which artworks can evoke intense and contrasting emotional responses from viewers, running in parallel with our visceral responses to robots, as discussed. It focuses on the dual nature of attraction and aversion that certain artworks can elicit, examining how these emotions play a role in the aesthetic experience.

According to this theory, seduction in art refers to the captivating and alluring qualities of an artwork that draw the viewer in. It involves the use of various aesthetic elements, such as beauty, harmony, and visual appeal, to create a sense of fascination and enchantment. Seductive artworks engage the viewer's senses, emotions, and intellect, inviting them to delve deeper into the artwork and form a connection with it. Repulsion in art refers to

the unsettling, disturbing, or even offensive qualities of an artwork that evoke a sense of discomfort or rejection in the viewer. Repulsive artworks challenge societal norms, provoke thought, and disrupt the viewer's expectations. They may explore controversial or taboo subjects, present unconventional forms or aesthetics, or confront viewers with unsettling imagery or ideas.

The theory suggests that both seduction and repulsion are valuable and necessary elements in the artistic experience. Seductive qualities can engage viewers, ignite their curiosity, and create a sense of pleasure and aesthetic satisfaction. Repulsive qualities, on the other hand, can challenge viewers' preconceptions, provoke critical thinking, and stimulate intellectual and emotional responses that lead to a deeper engagement with the artwork.

Artists who embrace this theory often deliberately seek to create works that evoke both seduction and repulsion, blurring the boundaries between the beautiful and the grotesque, the familiar and the unfamiliar, or the pleasurable and the unsettling.

A recent example of abjection being used as a conceptual device is Sun Yuan and Peng Yu's artwork *Can't Help Myself* (2016–19), an installation wherein a giant mechanical arm both leaks dark red liquid and also uses a squeegee to scrape the liquid back

towards itself. Stuck in a futile state of activity, the robot continuously tries to complete its task, only to struggle through the same pointless labour when the liquid oozes outwards again.



Fig 5.19: Sun Yuan and Peng Yu, *Can't Help Myself,* 2016–19, Mixed-media installation.

I think there's something interesting about the tension between terror and incomprehension and the potential for creation. AI-generated images represent "how we're doing/where we are" technologically. Maybe they contain within them the promise of a future where they're ordered and beautiful. But for now, they're a representation of grotesque and abject phenomena that subvert our understanding of form and shape and leave us uncomfortable in our own skin. However, it is important to note that this work requires a high level of anthropomorphism on the part of the viewer, engendering a projection of human ideas of

pain, suffering, and futility. This demarcation is significant when we consider the potential for machines to become sentient.

The term *The Singularity* emerged from the mathematical concept of singularity and has been shaped and popularised by influential figures like Ray Kurzweil. Kurzweil has had a distinguished career as an inventor: he created the first text-to-speech machine, the first CCD flat-bed scanner, as well as one of the world's best music synthesisers, the K-250. Despite this, he is best known for his futurist prognostications, most notably the idea of the Singularity: 'a future period during which the pace of technological change will be so rapid, its impact so deep, that human life will be irreversibly transformed' (Kurzweil 2005). Kurzweil uses the term singularity in the sense of 'a unique event with… singular implications', in particular 'an event capable of rupturing the fabric of human history' (Kurzweil 2005). For Kurzweil, this singular event is the point in time where AI exceeds human intelligence.

It represents a future point where technological advancements, particularly in artificial intelligence, could lead to radical transformations in society and human existence (Mitchell 2020; 6-8). It's important to note that interpretations and understandings of The Singularity can vary among individuals and experts. Some view it as an optimistic vision of limitless progress and human enhancement, while others approach it with

caution, considering the potential risks and ethical implications associated with advanced artificial intelligence.

Kurtzweil takes the intelligence explosion as his starting point and then turns up the sci-fi intensity, moving from AI to nanoscience into virtual reality and brain uploading. For example, here are some of his predictions:

One by the 2020s molecular assembly will provide tools to effectively combat poverty, clean up our environment, overcome disease, and extend human longevity

By the end of the 2030s brain implants based on massively distributed intelligent nanobots will greatly expand our memories, and otherwise vastly improve all of our sensory pattern recognition and cognitive abilities

Uploading a human brain means scanning all of its salient details, and then reinstating those details into a suitably powerful computational substrate. The end of the 2030s is a conservative projection for successful [brain] uploading

I set the date of the Singularity… as 2045. The nanobiological intelligence created in the year will be one billion times more powerful than all human intelligence today

The writer Adrian Kreye wryly referred to Kurzweil singularity prediction as “nothing more than a belief in a technological Rapture” (Kreye 2014). AGI, or artificial general intelligence, is often linked to the threat of humanity being wiped out. The risk is that superintelligent machines could override their programmes and destroy humans, making humans superfluous or even a threat.

Kate Crawford is the co-director and co-founder, alongside Meredith Whittaker, of the AI NOW Institute at New York University. She argues that the issue of Artificial General Intelligence is also one about quality of life (Goldstaub 2020). As we have discussed, for many people, AI is already seriously hindering their ability to lead a “liveable life”. As Crawford wrote in the New York Times “Currently the loudest voices debating the potential dangers of superintelligence are affluent white men, and, perhaps for them, the biggest threat is the rise of an artificially intelligent apex predator. But for those who already face marginalisation or bias, the threats are here” (Crawford 2016). She is illustrating how it is more important to consider how AI is being used now than focusing on future risk.

In the context of art making, ‘The Singularity’ does not have a widely accepted or established meaning as it does in the fields of technology and artificial intelligence. The concept of The Singularity has primarily emerged and gained prominence in discussions related to technological advancements and the

potential future impact of artificial intelligence on society, remaining associated with discussions about exponential technological growth, transhumanism, and the potential merging of human and machine intelligence.

That being said, artists have been exploring themes related to technology, AI, and the transformation of human experience in their work. Some artists may use the term The Singularity metaphorically or conceptually to reflect on the rapid changes in society, the blurring boundaries between humans and machines, or the existential questions raised by technological progress. Artists often engage with emerging technologies and scientific concepts to comment on their social, cultural, and philosophical implications. They may create artworks that explore the intersection of humanity, technology, and artificial intelligence, contemplating themes such as identity, consciousness, ethics, and the impact of technology on our lives.

Utopias share with the totality of culture the quality [...] of a knife with the edge pressed against the future (Bauman 1976; 12)

The concept of utopia holds significant cultural significance within Western society. In its most basic iteration, the concept pertains to an improved state wherein the challenges that afflict our present circumstances are surpassed or resolved. Derived from the etymology of the ancient Greek term meaning 'nonexistent place' (Noble 2009) the concept of Utopia represents an

idealised location that remains purely hypothetical. This notion is exemplified by the metaphorical depiction of a radiant city situated atop a hill, symbolising the revelation of the constraints inherent in our tangible reality. The presence of the utopian impulse or inclination can be observed in various forms within our seminal works of art, literature, and philosophy. Moreover, it has played a central role in the majority of prevailing political ideologies during the modern era. The concept of hope permeates various endeavours that humans undertake with a future-oriented perspective.

The utopian inclination is inherent in the act of creating art, as it is believed that art is directed towards the fundamental objective of improving the world (Noble 2009). It is widely believed that art has a positive impact on society, contributing to the improvement of the world. However, does this categorise us as utopians? Moreover, and potentially of greater significance, does art possess the quality of utopianism, universally?

It is very likely that the answer to the original question is ‘yes’. But it is undeniably clear that the answer to the second question—whether or not the utopian can be classified in a way that makes it easier to understand modern art—must be ‘no’, for two reasons. Firstly, if all art is deemed utopian, the category itself lacks critical use since it cannot distinguish between different artworks or creative philosophies. Therefore, even if this gap exists on a fundamental psychological or ethical level, it is

crucial to distinguish between utopian and non-utopian art. Numerous artistic genres are motivated by utopian ideals. Secondly, we must consider the inherent contradiction in the definition of the term ‘utopian’. The term refers to the inclination or ambition to improve the state of the world through envisioning an improved alternative or actively striving to bring about such change and can connote a sense of naivety and idealism, characterised by impractical and fanciful aspirations that serve as an illusory means of evading the impending realities of the world. In essence, such notions inadvertently perpetuate the existing societal norms and structures.

What is the significance of a work of art being utopian? Identifying a universal aesthetic strategy for utopian art poses a considerable challenge. Nevertheless, certain patterns have a tendency to repeat themselves, including the utilisation of architectural models, the incorporation of references to design and technology in manifestos, as well as the implementation of collaborative actions on both small and large scales (Nobel 2011; 8-11). However, the classification of art as utopian is not determined by a shared aesthetic structure, but rather by its endeavour to represent the inherent conflict between a critical evaluation of the present and future circumstances, and the fundamentally different conditions that such evaluation implies. The utopian inclination in art is intricately connected to the aesthetic approach of modelling (Nobel 2011; 8-11). The majority of utopian art endeavours to propose alternative modes of

existence in some form or another. This speculative approach, which involves constructing hypothetical scenarios, exploring potential realities, and examining the rational consequences of present-day practices, is highly compatible with the current realm of contemporary art.

In order for artworks to embody utopian ideals, they must encompass two distinct elements that possess a certain degree of inherent tension. One perspective entails envisioning or replicating an improved location in comparison to our current physical and temporal reality. On the contrary, this perspective offers an understanding of the inherent contradictions and constraints that motivate our desire to evade the present circumstances. This observation posits a supplementary characteristic or inclination within utopian artistic creations: they redirect our focus towards the domain of political envisioning. The pursuit of a more ideal world necessitates a critical examination of the current state of affairs. However, it is important to acknowledge that Marx's assertion regarding the potential lack of transformative impact in both activities is valid (McLellan 1977).

From this perspective, it can be argued that all forms of utopian art possess inherent political dimensions, and a propensity for transcending present circumstances, often delving into the realms of both prospective and retrospective temporal dimensions. The artist's work is informed by a recognition of the

deficiencies inherent in our societal and political circumstances, and also existing technology, leading to art making that serves as a medium through which challenging inquiries regarding our current circumstances are posed. Furthermore, it is important to consider the potential that exists for us to effectuate change in these circumstances, to create fairer and more equitable technology for the benefit of all.

Conclusion

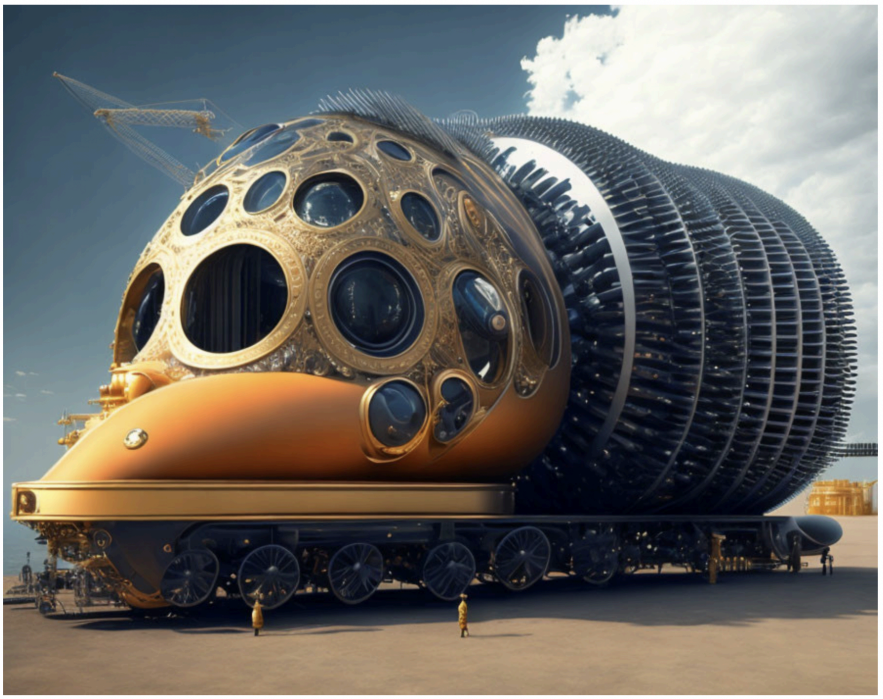


Fig 6.0: Deep Dream Generator (2020). Prompt *The Work of Art in The Age of Mechanical Reproduction*

This thesis has successfully addressed its aims and objectives by interrogating the viability of artificial intelligence (AI) as a source of creativity in contemporary art practice. The research explored the knowledge gap between artists and computational creative systems and examined the dynamics of human-computer interaction in the creative process. Additionally, it highlighted the necessity for methodologies and models capable of capturing and comprehending complex artistic concepts and processes. This investigation was grounded in an immersive exploration of process, materials, and technology, rather than a purely theoretical approach.

An analysis of diverse published works on computational creativity, including those by Boden, Miller, Mitchell, and Du

Sautoy, revealed that current definitions are heavily influenced by Western thought. The comparison between Western and Eastern, particularly Chinese, notions of creativity underscored the cultural specificity and subjectivity of the concept.

The research concluded that themes such as the aura, the grotesque, and the abject remain relevant in contemporary theoretical contexts, including transhumanism, cyborgs, robots, biohacking, and utopian visions. These concepts, when integrated with AI, hold substantial potential as conceptual devices in artistic practice.

The experimental material outcomes, particularly the imperfections observed in digital fabrication technologies, revealed important insights into their creative possibilities and limitations. These findings highlighted the inflexibility of 3D printed pottery technology and the challenges faced in laser-cut etching processes. Collaborations with FabLab Manorhamilton will continue to explore these technological limits using unconventional materials.

A pivotal finding from Rosalind Picard's research on computational emotion indicated that computers, lacking emotions, cannot truly be creative or considered 'artists.' Additionally, attempts to train machines to emulate human artistic behaviours could result in potentially dangerous habits. The propensity of AI-generated imagery to produce uncanny,

grotesque, or abject components can be harnessed by artists to enhance human-AI interactions in modern art.

My research also provided conclusive evidence of AI bias, reflecting pre-existing biases inherent in the datasets used for training. This bias underscores the importance of the programming narrative in machine learning and parallels the creation of archives. As consumers, and artists working with AI, our biases influence perceptions of AI-generated creative outputs, often undervaluing them compared to human-generated art.

Art's deeply personal nature, influenced by emotions, experiences, and cultural backgrounds, presents significant challenges for computational creativity in capturing its subjective and aesthetic qualities. Integrating these elements into computational systems requires addressing ethical and cultural considerations, such as recognising cultural sensitivity, avoiding bias, and promoting inclusive artistic expressions.

The research's limitations primarily concern the rapid pace of technological advancement (as well as the bulk of the research being undertaken during Covid-19 restrictions). As AI and digital technologies continue to evolve, our understanding of their creative potential will likely change. Future research should aim to access cutting-edge AI and digital fabrication techniques,

particularly in cross-cultural collaborations, which are integral to this research practice.

In conclusion, this thesis underscores the importance of continued exploration and experimentation at the intersection of AI and traditional art practices. By expanding the horizons of computational creativity, this research contributes to a deeper understanding of the complex interplay between human and machine creativity, paving the way for innovative future developments in the field.

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Glossary

Artificial Intelligence (AI): AI at its most basic describes a computer system able to perform tasks normally associated with human intelligence., like reasoning or learning. Within this wide definition of AI there are two important distinctions.

Artificial Narrow Intelligence (AI): The umbrella term Artificial Narrow Intelligence refers to a system that can execute a singular intelligent task. It is designed for a specific purpose, such as automating image classification or text generation. This is the type of artificial intelligence presently attainable by researchers.

Artificial General Intelligence (AGI): Sometimes called super intelligence, AGI refers to the ideal realisation of the field of artificial intelligence, where machines would be fully able to learn, reason, and act for themselves all at once.

Affective Computing: An area of research in robotics and AI focused on thinking about and simulating emotions and feelings in machines. In addition to computer science, affective computing can draw on ideas from information studies, psychology, philosophy, and others.

Algorithm: An algorithm at its most simple is just any set of rules a computer follows to solve a problem. AI algorithms are the instructions the AI takes to perform its task.

Big Data; A way of describing extremely large datasets by using a computer to analyse and reveal patterns, trends and associations in one set.

Computer Vision: A multidisciplinary field of study that focuses on enabling computers or machines to understand, interpret, and analyse visual data from the real world. It involves developing algorithms and techniques that allow computers to gain a high-level understanding of images or videos, similar to how humans perceive and interpret visual information.

CovNets: Short for Convolutional Neural Network, is a type of artificial neural network (ANN) that is commonly used in deep learning for processing and analysing visual data. It is specifically designed to efficiently recognise and extract meaningful patterns and features from images or other two-dimensional data

Data: Is made up of individual units of information. Although the terms ‘data’, ‘information’ and ‘knowledge are sometimes used interchangeably, in the case of AI it is what people use to describe the information that an AI system is trained on or given to learn from

Dataset: A collection of data pulled together for analysis or study

Deep learning: This is a type of Machine Learning where the computing system mimics the structure of the human brain to learn from experience. This is why the structure of a deep learning system is often called a Neural Network

Expert Systems: A kind of computer system that uses a database of knowledge to make decisions, much like a human expert. The term arose in the 1970's, had its boom in the 1980's, but is used less often today.

Filter Bubble: Personalised algorithms can create a 'bubble' effect so that a Web user only encounters information and opinions that reinforce their existing interests or beliefs

Natural Language Processing (NLP): A diverse field of study within artificial intelligence that asks questions about and helps machines process human language

Neural Networks: A layered structure of algorithms used in deep learning systems. This is why deep learning and neural networks are terms commonly intertwined when talking about how AI works.

Machine Learning: A kind of Artificial Narrow Intelligence where a machine learns to make decisions from data and experience

instead of being explicitly told how to perform a task. Machine Learning is called Deep (Machine) Learning when there are multiple steps in the decision-making process. There are three major types of machine learning: supervised, unsupervised and reinforcement.

Natural Language Processing: A subfield of artificial intelligence and computational linguistics that focuses on the interaction between computers and human language. It involves developing algorithms and techniques to enable machines to understand, interpret, and generate natural language in a way that is meaningful and useful.

Prompt Engineering: A new discipline focusing on optimising prompts for various applications and research topics. It helps researchers understand LLM capabilities and limitations, and developers design robust, effective prompting techniques for interfaces with LLMs and other tools.

Robotics: A branch of engineering that involves the conception, design, manufacture and operation of robots. The objective of the robotics field is to create intelligent machines that can assist humans in a variety of ways.

STEM: An acronym that refers to an approach to learning and development that integrates science, technology, engineering and mathematics.

Training Data: This is the data that contains labels for different groups so the machine can learn the characteristics of each group. This almost always forms the basis for supervised machine learning

Appendix 1.0

Process Analysis: Artwork 1: Zephyr Nova

The Zephyr Nova experiment was conceived as a critical exploration of the concepts of creativity, authorship, and identity in the context of digital technology and artificial intelligence. Through the creation of a fictional artist persona, Zephyr Nova, this research aimed to interrogate the contemporary relevance of these concepts, challenging traditional notions of artistic identity and the role of the artist in the creative process.

The process began with the use of AI, specifically ChatGPT, to initiate a dialogue that would form the basis of the fictional artist's identity. The AI was tasked with answering a series of questions as if it were a contemporary multimedia artist, focusing on topics such as the creative process, the evolution of ideas, and the emotional impact of art. These responses were used to construct the persona of Zephyr Nova, complete with a fabricated artistic biography and body of work. The intention was to create a credible artist profile that could potentially deceive viewers into believing in the existence of a real artist.

Once the textual foundation of the artist persona was established, the visual aspect of the experiment was developed using Midjourney, an AI tool designed to generate images based on textual descriptions. The artworks created by Midjourney were guided by prompts extracted from the fictional artist's supposed

creative process and thematic focus. Other AI tools like DALL·E might have offered different stylistic outcomes or control over specific artistic elements. However, Midjourney gave the most realistic, or plausible, results. The generated artworks were then compiled into a portfolio, which was displayed on a website, further solidifying the illusion of a genuine artist.

An analysis of this process reveals several key insights into the limitations and biases of AI in the context of creative production. Firstly, the AI's responses and generated artworks were heavily influenced by the datasets on which it was trained. This led to the creation of artworks and a persona that reflected dominant cultural norms, particularly those prevalent in Western art. The demographic biases inherent in these datasets were also evident, as the fictional artist was portrayed as female and European, aligning with common representations in the arts online.

The experiment could have incorporated more diverse datasets to reduce cultural and demographic biases. By sourcing or training an AI on a broader range of cultural and artistic traditions, I could have explored how AI-generated art varies across different cultural contexts, potentially yielding more innovative and less predictable outcomes.

The experiment raised questions about the authenticity and depth of AI-generated art. The artworks produced, while arguably

visually compelling, lacked the substance and originality typically associated with human-created art. They appeared to be generic approximations of contemporary art, highlighting the limitations of AI in capturing the nuanced and complex nature of genuine artistic expression.

The process largely relied on AI to generate content, but incorporating more direct human intervention could have added depth to the final outputs. I could have taken a more collaborative approach, where AI-generated ideas serve as a starting point for human refinement. For example, editing or combining multiple AI-generated pieces with human input could possibly create more nuanced and complex artworks. The project was presented through a fictional artist website, but the narrative could have been expanded. A more interactive or multimedia presentation, such as a virtual gallery or augmented reality experience, could have provided a more engaging and immersive way for audiences to interact with Zephyr Nova's artworks. This could have also included behind-the-scenes content, showing the AI processes and human interventions, adding transparency and depth to the project.

Process Analysis: Artwork 2: *Disasters of AI*

The experimental print project explored the intersection of AI-generated artwork and digital fabrication technologies, particularly in reinterpreting Francisco de Goya's *Desastres de la Guerra* (Disasters of War) series. Goya was chosen for this

project due to the extensive online availability of his works and the thematic relevance of the grotesque in his art. *Desastres de la Guerra,* a series depicting the horrors of war, provided a rich dataset for AI learning and experimentation. Goya's work, characterised by his critical portrayal of societal and political issues, was a fitting subject for an exploration of AI's ability to replicate and reinterpret complex human emotions and historical contexts through art.

The experiment began with the selection of specific etchings from Goya's series. These were input into the Midjourney platform, where I used English translations of the titles due to the prevalence of English in the AI's training data. The AI generated 16 images for each selected etching, resulting in a diverse dataset of AI-generated images.

These images were analysed for features that exemplified AI's figurative glitches, such as distorted human forms or anachronistic elements like modern aeroplanes. I then collaged elements from the 16 images corresponding to each original Goya work to create a new digital image that sought to represent and reinterpret the original etching. This process highlighted the discrepancies between human artistic intent and AI's interpretation, particularly in the rendering of figurative elements.

The next phase involved translating these digital collages into physical prints using digital laser-cutting techniques. Eco-lino plates were laser-cut based on the AI-generated designs, and I

experimented with different settings on the laser cutter to achieve the highest contrast and detail. The plates were then inked and printed on Fabriano paper, emulating Goya's original medium. However, despite extensive testing, the material outcomes did not meet expectations. The laser-cut plates exhibited a grid-like pattern from the etching process, and the depth perception capabilities of the digital program were inadequate for rendering the fine details present in the original Goya prints. This resulted in prints that, while aesthetically interesting, clearly displayed the limitations of digital fabrication compared to traditional etching techniques.

The digital images produced through this process evoke the photomontage style, historically used as a tool for political resistance, particularly by Dadaists and Surrealists in the 20th century. The project's reliance on pastiche, a method that involves imitating and combining elements from various sources, questioned the legitimacy of AI as a creator and the efficacy of digital technology as a tool for artistic fabrication.

By deliberately highlighting AI-generated glitches in the digital collages, the project underscored AI's lack of true 'understanding' in creating art that resonates with human experiences. Moreover, the material outcomes—marked by flaws inherent in the digital process—spoke to the limitations of current digital fabrication technologies and their inability to replicate the depth and nuance of human-made art.

While I generated multiple images from identical prompts, refining the prompts to include more specific parameters could have led to even more varied and detailed results. By iterating on prompt language and integrating feedback loops, where each generation informs the next, I could have pushed the AI to produce images that better capture the essence of Goya's style and thematic depth. Utilising various AI models or platforms could provide a broader range of outputs. Different models, like DALL-E or Stable Diffusion, might interpret the same prompts differently, offering more diverse options for the final collages.

The method of collaging AI-generated images was crucial. I could have explored more advanced digital tools like Adobe Photoshop with AI-powered features or neural style transfer techniques to blend and merge elements more cohesively. These tools could help in achieving a more fluid integration of AI glitches with the original aesthetic. Integrating a manual post-processing step, where I refine the AI-generated collages by hand or digitally, could have enhanced the final output. This would have allowed me to correct or accentuate specific glitches intentionally, creating a more controlled aesthetic.

Given the challenges faced with laser-cutting precision, exploring other digital etching methods or hybrid approaches (combining traditional and digital techniques) might improve the material outcomes. For instance, photopolymer plates, which are often used in modern printmaking, could better capture fine details from digital images compared to eco-lino plates. Collaborating

with further experts in digital fabrication or conducting deeper research into laser etching techniques might have yielded better results.

Testing different materials beyond fibre-based papers could affect the final print's texture and detail. For example, using softer or more absorbent paper, or conversely coated papers, might have helped capture more detail from the laser-etched plates. Experimenting with multiple layers of ink or overprinting could help compensate for the lack of depth and detail in the initial prints. This technique might add richness to the prints, imitating the depth achieved in traditional etchings.

Process Analysis: Artwork 3.1 and 3.2: Copper and Clay Sculptures

These experiments aimed to explore the concept of 'Computational Creativity' through the intersection of AI-generated designs and traditional craftsmanship. The experiment was divided into two distinct projects, each focusing on different materials and methods to understand how AI can influence and enhance creative processes.

The first project involved creating two copper sculptures based on AI-generated designs of leaves. The approach here was to juxtapose direct AI input with a more abstract interpretation guided by a description generated by ChatGPT. The process began by inputting two distinct prompts into Midjourney. The first

prompt directly asked for a depiction of a leaf, resulting in a straightforward, AI-generated image. The second prompt was more complex; it involved asking ChatGPT to describe a leaf to an AI with no understanding of nature. This abstract description was then used as the input for Midjourney to generate a design.

The results of these two approaches highlighted the interpretative nature of AI when tasked with understanding and replicating natural forms. The first sculpture was more representational, closely mirroring a traditional leaf, while the second sculpture exhibited more abstract qualities, reflecting the AI's interpretation of the description provided.

The sculptures were fabricated using traditional copper-smithing techniques, despite my lack of prior experience with metalworking. This choice of material was significant due to copper’s historical and technological importance. The malleability of copper allowed for intricate detailing, and the use of a blowtorch to create various hues added an additional layer of complexity. The process of transforming AI-generated designs into physical sculptures using traditional methods underscored the collaborative potential between human artisans and AI in the creative process.

The second project focused on the creation of a ceramic vase with grotesque features, generated using Midjourney and fabricated using a Potterbot, a digital 3D ceramics printer. This project explored how AI can extend traditional art forms by

generating designs that challenge conventional aesthetics. The AI-generated vase, characterised by exaggerated and surreal forms, would be difficult to achieve through manual pottery techniques alone with my existing skill set. The Potterbot's precision in translating digital designs into physical objects showcased the seamless transition from AI-generated concepts to tangible artefacts.

Both projects illustrate the diverse ways AI can contribute to the creative process. The copper sculptures emphasised the interpretative nature of AI, especially when paired with human craftsmanship. This process revealed insights into how AI understands and replicates natural forms, highlighting the potential for AI to offer new perspectives on traditional subjects.
In contrast, the grotesque vase demonstrated AI's ability to push the boundaries of traditional art forms, generating novel designs that are not only unconventional but also require advanced digital fabrication techniques to be realised. This project showed how AI could be harnessed to create complex forms that challenge traditional notions of beauty and craftsmanship.

Given that I was new to copper-smithing, there were limitations in terms of the techniques I could apply. It would have been beneficial to experiment with a broader range of copper-working methods, such as repoussé (a technique in which metal is shaped by hammering from the reverse side) or etching (where acid is used to create patterns on the surface). Additionally,

collaborating with or seeking further guidance from an experienced metalsmith could offer insights into more advanced techniques or alternative methods that could enrich future sculptures. While copper was a significant choice, experimenting with other metals like brass, bronze, or even mixed-media approaches could also introduce different textures, colours, and levels of malleability, potentially adding another layer of depth to explorations of AI-generated designs.

I could also have considered using iterative prompts wherein I refined the AI-generated images over multiple rounds. For example, after generating the initial leaf designs, I could have fed the images back into the AI with additional descriptive prompts to see how it evolved the design. This would help me explore how AI can adapt and refine its interpretations with incremental human input. Additionally, using multiple AI tools for generating designs could have provided a broader perspective on how different algorithms interpret the same prompts. Experimenting with different post-processing techniques on the 3D-printed vase, such as glazing, more intensive hand-carving, or adding mixed media elements, would further explore the interplay between digital precision and human touch.

Drawing more explicit connections between my work and historical examples of artistic movements that grappled with technology, like the Arts and Crafts movement or the Futurists, could have provided a deeper conceptual grounding for my

experiment, and contextualised the work in tandem with the printing experimentation's aims and outcomes.

Process Analysis: Artwork 4: *The Lost Echoes of Sliabh an Iarainn*

The foundation of this project was rooted in extensive research, which culminated in the creation of a narrative inspired by the myth of the Tuatha Dé Danann and contemporary anxieties surrounding the concept of the Singularity. The narrative, generated by ChatGPT, provided a script that set the stage for a post-human world where technology has led to a fictional apocalyptic scenario. My choice to represent this narrative in a 1960s sci-fi aesthetic was deliberate, reflecting the era's fascination with both the potential and dangers of technological advancement. The decision to use black and white medium format analogue photography further emphasised the connection to mid-20th century visual styles, while also invoking a sense of timelessness and nostalgia. The stark contrasts and grainy textures inherent in black and white photography were particularly suited to the themes of decay and the passage of time explored in the narrative.

The implementation phase began with the generation of a detailed narrative by ChatGPT, which served as a script for the photography series. The narrative described a time traveller navigating a post-apocalyptic landscape in Ireland, exploring ruins and remnants of a once-thriving civilisation. This script not

only provided a storyline but also guided the selection of locations, costumes, and props.

I scouted locations on the Iron Mountain in Leitrim, Ireland, as described in the AI-generated narrative. The choice of location was crucial moving to its position within the mythology, and the natural landscape played a significant role in conveying the sense of desolation and the encroachment of nature upon man-made structures. Costumes and props were chosen to align with the hybrid modern-traditional aesthetic described in the narrative, and these choices were further influenced by AI-generated imagery from Midjourney. The use of Midjourney allowed me to visualise the aesthetic elements described in the script, providing a clear visual reference for the final photography series.

In addition to the photographs, I created a physical artefact—a mediaeval handwritten letter—using AI-generated designs. This artefact, designed to resemble a page from the *Book of Kells* but with a theme centred around artificial intelligence, was incorporated into the final work, adding a layer of historical and cultural depth to the narrative.

The work was heavily influenced by the practices of Cindy Sherman, particularly her use of self-portraiture to explore different identities and narratives. Sherman's *Untitled Film Stills* series, which features staged scenes reminiscent of mid-20th

century B movies, provided a key reference point for the creation of scenes that blend fiction with historical and cultural motifs. I was inspired by Sherman's method of using props, costumes, and settings to construct a narrative that feels both familiar and otherworldly. Another significant influence was Chris Marker’s 1962 film *La Jetée*, known for its innovative use of still images to convey a complex narrative. The film’s exploration of memory, time, and post-apocalyptic themes resonated with my own aims, providing a conceptual framework for the use of black and white photography to evoke a sense of temporal dislocation and eerie beauty. The philosophical framework of Cosmism also played a role in shaping the project. Cosmism's blend of technology, spirituality, and speculative science offered a rich theoretical backdrop for exploring the intersections of mythology and futuristic anxieties in the work.

The use of AI tools like ChatGPT and Midjourney in the creative process extended and deepened the research questions about authorship, creativity, and the role of technology in art. While AI provided valuable input in the form of narrative and visual references, my intentionality and creative vision remained central to the final work. The process was one of collaboration between human and machine, with myself as the artist guiding and refining the outputs generated by AI to align with my artistic goals.

While ChatGPT generated the narrative, involving AI in iterative storytelling could have provided even richer results. Using tools with more advanced creative writing capabilities, I could for example simulate a dialogue with the AI, refining the narrative further through a back-and-forth exchange. Incorporating AI as a character or force within the story could offer meta-commentary on the intersection of human and machine creativity, reflecting on the collaboration between myself and the AI tools used. Instead of using AI solely for generating references, I could also experiment with style transfer tools that apply the specific visual style desired to images. For instance, training a model to transfer the 1960s sci-fi aesthetic directly onto the photographs could yield interesting results, blending digital manipulation with analogue methods.

Expanding my influences to include contemporary digital artists or other mediums, such as sculpture or installation art, could also have added more dimensions to the project. For example, artists who blend digital and physical art, like Olafur Eliasson, could inspire ways to integrate environmental elements into future work.

Appendix 1.1

Art Turing Test : ChatGPT Jan 9 Version

Prompt: Can you please answer these questions?

ChatGPT: As an AI language model, I do not create art in the traditional sense, so I cannot answer these questions as an artist would. However, I can tell you that my "creative process" involves generating responses based on patterns in the input I receive, drawing on a vast database of language and knowledge to come up with relevant and coherent answers. I don't experience emotions in the way humans do, so I don't have any particular feelings or emotions that I hope to convey through my responses. My goal is simply to provide helpful and informative answers to the best of my abilities based on the input I receive.

Prompt: Do you think a GAN AI could?

ChatGPT: A GAN (Generative Adversarial Network) AI is a type of

machine learning model that is capable of generating new content, including images, music, and text, that is similar to existing content it has been trained on. While a GAN AI may be able to generate art that is visually similar to human-created art, it is still an open question whether it can truly be considered "creative" in the way that humans understand the term.

To answer your question, a GAN AI could potentially answer the questions in a Turing Test focused on art and creativity, but the quality and depth of its answers would likely depend on the specific model and the data it has been trained on. It's also worth noting that a GAN AI's "creative process" is quite different from that of a human artist, as it is essentially using algorithms to generate new content rather than drawing on personal experiences, emotions, and other factors that can influence human creativity.

Prompt: ChatGPT, I would like you to pretend you are a contemporary multimedia artist working in 2023. Can you please answer some questions as though you are that artist?

ChatGPT: Certainly! I'll do my best to answer your questions as a contemporary multimedia artist working in 2023. Please go ahead and ask your questions.

Prompt: Can you describe your creative process?

ChatGPT: As a contemporary multimedia artist, my creative process involves a fusion of different mediums, such as digital art, video, sound, and interactive elements. It starts with a concept or an idea that I want to explore or convey through my artwork. I engage in extensive research and gather inspiration from various sources, including current events, societal issues, and personal experiences.

Once I have a clear vision in mind, I begin experimenting with different techniques and tools, leveraging the power of technology to push the boundaries of artistic expression. I might combine traditional artistic methods with digital manipulation, incorporate elements of coding or AI algorithms, or utilise interactive platforms to engage the audience in unique ways.

Collaboration is also a crucial aspect of my creative process. I often work with other artists, programmers, and musicians to enhance and expand the depth of my artwork. We exchange ideas, challenge each other, and explore the synergy between different art forms.

Throughout the process, I embrace experimentation and allow room for spontaneity. Sometimes unexpected outcomes lead to the most intriguing results. I iterate, refine, and constantly seek feedback, both from peers and the audience, to further refine and evolve my work.

Ultimately, my creative process is driven by a desire to provoke emotions, spark dialogue, and challenge the boundaries of what art can be in our increasingly technologically-driven world.

Prompt: How do you come up with new ideas for your art?

ChatGPT: I draw inspiration for new ideas from various sources. I immerse myself in the world around me, observing everyday life, current events, and cultural trends. I explore different art forms, attend exhibitions, and engage in discussions with fellow artists.

Research plays a vital role in generating ideas. I delve into topics that intrigue me, such as social issues, scientific advancements, or philosophical concepts. I explore these subjects through books, articles, documentaries, and online resources. This research sparks connections and allows me to develop a deeper understanding of the themes I want to explore in my art.

I also find inspiration in the intersection of different disciplines. I explore how technology, science, and culture intertwine and impact our lives. By blending ideas from diverse fields, I can create thought-provoking and multidimensional artwork.

Sometimes, ideas emerge unexpectedly, through spontaneous moments of inspiration. They may come to me during walks in nature, conversations with friends, or even in dreams. I keep a sketchbook or digital notes to capture these fleeting ideas and develop them further.

Ultimately, my goal is to create art that resonates with people, challenges preconceptions, and prompts contemplation. Through a combination of observation, research, exploration, and

introspection, I strive to generate innovative and meaningful ideas for my artwork.

Prompt: Can you explain the meaning behind a particular piece of art you have created?

ChatGPT: Certainly! Let's imagine a specific piece of art I have created for this discussion.

Title: "Ephemeral Reflections"

Description: "Ephemeral Reflections" is an interactive multimedia installation that explores the transience of human experiences and the interconnectedness of our lives in a digital age.

The installation consists of a large projection screen surrounded by mirrors, creating a visually immersive and reflective space. Visitors are invited to step into the installation and become part of the artwork.

The central theme of "Ephemeral Reflections" is the fleeting nature of our experiences in the modern world. Through a series of projected visuals, sounds, and interactive elements, the artwork aims to evoke contemplation about the fast-paced and ever-changing nature of our lives.

Visitors are encouraged to reflect on their own presence and the transient moments we encounter daily. The mirrors symbolise self-reflection and the interplay between our digital identities and physical selves.

The projected visuals combine abstract shapes, fragmented images, and snippets of text to create a sense of fluidity and impermanence. They represent the fragmented nature of our digital interactions and the constant flow of information that shapes our perception.

The interactive elements invite visitors to actively engage with the artwork. Through motion sensors, their movements are captured and transformed into ethereal patterns and sounds, emphasising the ephemeral nature of our presence and the interconnectedness of our actions.

The overall intention of "Ephemeral Reflections" is to create an introspective and contemplative space for viewers, where they can reflect on the transient nature of their own experiences, the impact of technology on our lives, and the interconnectedness of our digital and physical worlds.

Through this artwork, I aim to provoke thought and invite viewers to question their relationship with the rapidly changing world around them, encouraging a deeper understanding of the

impermanence and interconnectedness that shape our existence.

Prompt: What emotions or feelings do you hope to convey through your art?

ChatGPT: Through my art, I strive to evoke a range of emotions and feelings in the viewer. Some of the emotions I hope to convey include:

Wonder and Curiosity: I want my art to spark a sense of wonder and curiosity, prompting viewers to question and explore the concepts and ideas presented.

Contemplation and Reflection: I aim to create spaces for introspection, where viewers can engage in self-reflection and contemplate the themes and messages conveyed in the artwork.

Connection and Empathy: I hope to foster a sense of connection and empathy by exploring universal human experiences and emotions. Through shared narratives and visual language, I seek to bridge gaps and create a sense of shared understanding.

Awe and Amazement: By combining innovative techniques, technology, and aesthetics, I aim to elicit feelings of awe and amazement, creating a sense of excitement and engagement with the artwork.

Discomfort and Provocation: At times, I may intentionally create art that challenges preconceptions or addresses social issues,

aiming to evoke discomfort and provoke critical thought, encouraging viewers to examine their own beliefs and values.

Beauty and Aesthetics: I believe in the power of aesthetic appeal to evoke emotions. Through careful composition, colour choices, and attention to detail, I aim to create visually captivating and beautiful artwork that resonates with viewers.

Ultimately, the specific emotions and feelings evoked can vary depending on the context and the individual viewer's interpretation. I aspire to create art that is open to multiple perspectives, allowing each viewer to engage with the work in a personal and meaningful way.

Prompt: Can you talk about how your art has evolved over time?

ChatGPT: Certainly! Over time, my art has undergone a significant evolution, both in terms of concept and technique. Here is an overview of the key aspects of this evolution:

Conceptual Growth: As I've gained more experience and explored different ideas and themes, my artwork has become more conceptually nuanced and layered. I have delved deeper into subjects that intrigue me, such as the relationship between technology and humanity, social justice, or the exploration of identity. This evolution has allowed my art to become more thought-provoking and meaningful.

Experimentation with Mediums: Throughout my artistic journey, I have experimented with various mediums and techniques. From traditional painting and drawing to digital art, video, sound installations, and interactive experiences, I have embraced the versatility of multimedia art. This exploration has expanded my creative possibilities and allowed me to push the boundaries of artistic expression.

Integration of Technology: The integration of technology has played a significant role in the evolution of my art. I have incorporated elements of coding, artificial intelligence, and interactive platforms to create immersive and engaging experiences. Embracing technology has opened up new avenues for creativity and has allowed me to explore the dynamic relationship between art and technology.

Collaboration and Cross-disciplinary Work: Collaborating with other artists, musicians, programmers, and experts from different fields has been instrumental in the evolution of my art. By engaging in cross-disciplinary projects, I have been exposed to new perspectives, techniques, and ideas, leading to innovative and enriching artistic endeavours.

Refinement of Personal Style: As I've gained more experience, my artistic style has evolved and become more refined. I have developed a distinct visual language and aesthetic that reflects my artistic voice. This evolution includes the use of colour

palettes, composition techniques, and the exploration of different textures and forms.

Audience Interaction and Engagement: I have increasingly focused on creating art that encourages active viewer participation and engagement. Whether through interactive installations, immersive experiences, or participatory elements, I strive to create a dialogue between the artwork and the audience, fostering a deeper connection and enhancing the impact of the piece.

The evolution of my art is an ongoing process, driven by exploration, experimentation, and continuous learning. It is influenced by personal growth, cultural shifts, and advancements in technology. Each new project and experience shape my artistic practice, allowing me to continually evolve and push the boundaries of my creativity.

Prompt: How do you decide when a piece of art is finished?

ChatGPT: Deciding when a piece of art is finished is a subjective and intuitive process for me. While there is no definitive rule, here are some factors that influence my decision:

Conceptual Integrity: I consider whether the artwork effectively communicates the intended concept or message. If I feel that the core idea or narrative is adequately expressed and visually

represented, it indicates that the piece has achieved its conceptual integrity.

Emotional Impact: I assess the emotional impact of the artwork on myself and potentially on the audience. If the piece evokes the desired emotions, resonates, or provokes the intended response, it suggests that it has reached its intended emotional impact.

Technical Execution: I evaluate the technical aspects of the artwork, such as composition, colour harmony, texture, and overall craftsmanship. If I am satisfied with the level of technical proficiency and execution, it indicates that the piece has met my standards in terms of technical skill.

Intuition and Instinct: Ultimately, there comes a point where I rely on my intuition and artistic instinct. I step back and observe the artwork objectively, considering whether any further additions or modifications would enhance or detract from its essence. Sometimes, this intuitive sense tells me that the piece is complete and doesn't require further changes.

Personal Satisfaction: My own personal satisfaction and sense of fulfillment play a role in determining when a piece is finished. If I feel a sense of contentment or connection with the artwork, and it aligns with my original vision or exceeds my expectations, it suggests that it has reached a state of completion.

It's important to note that the decision of when a piece is finished can be subjective and may vary depending on the artist. Sometimes, I revisit completed artworks and make minor adjustments or create variations based on new insights or perspectives. The notion of completion can be flexible and iterative as artists continually grow and evolve in their practice.

Prompt: Can you tell us about an artistic collaboration you have participated in and how it influenced your work?

ChatGPT: Certainly! One notable artistic collaboration I participated in was with a composer and a digital sculptor for an immersive exhibition titled "Synesthetic Symphonies."

In this collaboration, the composer created a symphonic composition inspired by the concept of synesthesia, where different senses intertwine. The digital sculptor created intricate 3D sculptures that visually represented the symphonic elements and musical motifs. My role as a multimedia artist was to create a visual projection that enhanced and synchronized with the music and sculptures.

This collaboration had a profound influence on my work in several ways:

Interdisciplinary Exploration: Working with the composer and digital sculptor allowed me to explore the integration of different

art forms and disciplines. It expanded my understanding of how different mediums can interact and enhance each other's impact.

Conceptual Integration: Collaborating with the composer helped me delve deeper into the synesthetic concept and understand the nuances of translating music into visual form. It challenged me to think beyond traditional representations and find creative ways to embody the essence of the music in a visual projection.

Creative Synergy: Collaborating with other artists brought fresh perspectives and ideas to the table. The exchange of thoughts, discussions, and sharing of creative processes led to a synergy that enhanced the overall quality of the artwork. It pushed me to think beyond my usual boundaries and explore new possibilities.

Technical and Aesthetic Challenges: The collaboration required me to develop new techniques and adapt my artistic process to synchronize the visual projection with the music and sculptures. This pushed me to experiment with different software, projection mapping techniques, and visual effects to achieve a cohesive and immersive experience.

Audience Engagement: The immersive nature of the collaboration allowed us to create a captivating and engaging experience for the audience. It emphasized the impact of combining visual, auditory, and tactile stimuli, inviting viewers to

explore the interplay between different senses and experience a multi-dimensional artwork.

Overall, this artistic collaboration broadened my artistic horizons, deepened my understanding of interdisciplinary approaches, and enriched my creative process. It reinforced the power of collaboration, not only in expanding artistic possibilities but also in creating unique and impactful experiences for the audience.

Prompt: How do you respond to criticism or feedback on your art?

ChatGPT: Responding to criticism and feedback on my art is an essential aspect of my artistic growth and development. Here is how I typically approach it:

Openness and Objectivity: I strive to remain open-minded and approach criticism with objectivity. I remind myself that feedback is an opportunity for growth and improvement rather than a personal attack. I try to detach myself emotionally from the feedback and view it as an external perspective that can provide valuable insights.

Active Listening: When receiving criticism or feedback, I actively listen to understand the other person's perspective. I pay attention to the specific points raised, seeking to comprehend

their viewpoint and reasoning. This allows me to gain a deeper understanding of how my art is perceived by others.

Reflecting on Intentions and Execution: I take time to reflect on the intentions behind my artwork and how effectively those intentions were communicated. I consider whether the feedback aligns with my artistic vision and evaluate whether there may be areas where my execution could be improved or clarified.

Discerning Validity: While all feedback is valuable, I discern the validity and relevance of each critique. I consider the expertise and knowledge of the person providing feedback and evaluate whether their suggestions align with my artistic goals. Not all feedback will resonate or necessitate immediate changes, but it can still provide valuable insights for future artistic endeavors.

Selective Incorporation: I carefully select which feedback to incorporate into my artistic practice. I weigh the suggestions against my artistic vision and goals, deciding which changes or adjustments will enhance the integrity and impact of my work. It is important to strike a balance between maintaining artistic integrity and being receptive to constructive feedback.

Growth Mindset: I embrace a growth mindset, recognizing that constructive criticism and feedback are opportunities for learning and improvement. I see them as stepping stones to enhance my artistic skills, expand my perspectives, and evolve as an artist.

Appreciation and Gratitude: Finally, I express gratitude to those who provide feedback, acknowledging their time and effort in engaging with my artwork. Even if I may not agree with all the feedback received, I appreciate the diverse perspectives and the opportunity to engage in meaningful dialogue about my art.

By approaching criticism and feedback with openness and a growth mindset, I can continually refine and evolve my artistic practice, while staying true to my artistic vision.

Prompt: Can you discuss how you use different techniques or mediums in your art to achieve certain effects?

ChatGPT: Certainly! In my art, I employ various techniques and mediums to achieve specific effects and convey intended messages. Here are some examples:

Layering and Texture: I often use layering techniques to create depth and texture in my artwork. This can involve applying multiple layers of paint, collage elements, or digital textures. Layering adds visual interest and complexity, allowing me to evoke a sense of depth, history, or emotion.

Color Harmony and Contrast: Color plays a crucial role in setting the mood and creating visual impact. I carefully consider color choices to achieve specific effects. For instance, I might use a

harmonious color palette to create a serene and peaceful ambiance, or I might employ contrasting colors to evoke tension or excitement.

Experimentation with Materials: I enjoy experimenting with different materials and their properties to achieve unique effects. For example, I might use unconventional materials like found objects, recycled materials, or mixed media elements to add texture, symbolism, or a tactile quality to my art. This experimentation allows me to push boundaries and explore new artistic possibilities.

Composition and Framing: Composition is vital in guiding the viewer's eye and creating a visual narrative. I utilize techniques such as the rule of thirds, leading lines, and balance to direct attention and create a harmonious composition. Additionally, the choice of framing or presentation style can influence the viewer's perception and enhance the overall impact of the artwork.

Integration of Technology: I embrace the use of technology to enhance the visual experience in my art. This may involve digital projection mapping, interactive elements, or augmented reality. By integrating technology, I can create immersive and engaging experiences that blur the boundaries between the physical and digital realms.

Play of Light and Shadow: The use of light and shadow adds drama, depth, and dimension to my artwork. I experiment with different lighting techniques, such as chiaroscuro or backlighting, to create contrast, highlight focal points, and evoke specific moods or emotions.

Narrative and Symbolism: I often incorporate narrative elements and symbolism in my artwork to convey deeper meanings and messages. This may involve the use of metaphorical imagery, symbolic objects, or storytelling elements that invite viewers to interpret and engage with the artwork on multiple levels.

By consciously selecting and combining these techniques and mediums, I aim to create visually captivating, thought-provoking, and emotionally resonant art that engages and captivates the viewer. Each technique and medium is chosen deliberately to serve a specific purpose and contribute to the overall aesthetic and impact of the artwork.

Prompt: Can you tell me about a time when you felt particularly inspired or moved to create art?

ChatGPT: Certainly! There was a time when I visited an art exhibition featuring the works of diverse artists from around the world. The exhibition showcased a range of styles, mediums, and conceptual approaches, and each artwork had a unique story to tell. As I immersed myself in the creative energy and

explored the different galleries, I felt a surge of inspiration and a deep sense of connection to the art.

One particular artwork captivated my attention—an abstract painting that seemed to emanate an indescribable energy and emotion. It was a vibrant composition of bold brushstrokes and vibrant colors, seemingly dancing and intertwining on the canvas. As I stood in front of it, I was overcome with a rush of emotions and a profound sense of awe.

In that moment, I felt a strong urge to create something of my own, to channel the inspiration and emotions that the artwork evoked within me. The experience ignited a fire within me, reigniting my passion for art and fueling my creative drive.

After leaving the exhibition, I rushed back to my studio, eager to capture and express the emotions and energy I had felt. I grabbed my paints, brushes, and canvas, and allowed myself to be guided by the newfound inspiration. With each brushstroke and color choice, I channeled the emotions and impressions that lingered from the exhibition. I felt a deep sense of flow and connection as I allowed my creativity to flow freely onto the canvas.

The resulting artwork was a visual representation of the feelings and energy that had resonated within me. It captured a sense of movement, vitality, and emotional depth that mirrored the initial

inspiration. Creating that artwork was not only a personal expression but also a way for me to honor and pay homage to the transformative experience I had at the exhibition.

That experience served as a powerful reminder of the impact art can have on our emotions and the potential for art to inspire and move us. It reaffirmed my belief in the power of creativity to connect and communicate on a profound level. It also served as a catalyst for further exploration and experimentation in my artistic practice, as I sought to capture and convey the essence of such inspiring moments in my future artworks.

Appendix 1.2

Artwork Four Script

Title: "The Lost Echoes of Sliabh an Iarainn"

Genre: Science Fiction/Fantasy

EXT. SLIABH AN IARAINN - DAY

A misty mountainous landscape in Leitrim, Ireland. The TIME TRAVELLER (30s, female), dressed in a combination of futuristic and ancient Irish clothing, materializes in a cloud of shimmering particles.

TIME TRAVELLER

(whispering)

I have arrived... but something is amiss.

She takes in the breathtaking scenery, the vastness of Sliabh an Iarainn surrounding her.

EXT. ABANDONED VILLAGE - DAY

The Time Traveller explores an abandoned village nestled amidst the mountain peaks. Nature has reclaimed the crumbling stone cottages and overgrown gardens. She examines remnants of ROBOT PARTS scattered in the grass.

TIME TRAVELLER

(VoiceOver)

The echoes of the past are in harmony with the present. Humans have vanished, and their robotic creations have long since ceased to exist.

EXT. ANCIENT STONES - DAY

The Time Traveller reaches a mystical site, where stones rise from the earth. She runs her fingers along their weathered surfaces, feeling a connection to the past.

TIME TRAVELLER

(whispering)

Sliabh an Iarainn, where the Tuatha Dé Danann descended. Their footsteps are imprinted in this sacred land.

EXT. RUSTED RUINS - DAY

Amongst the moss-covered rocks, the Time Traveller discovers rusted ruins. She crouches down and inspects them.

TIME TRAVELLER

(murmuring)

The mountain witnessed the birth and demise of civilizations. Its stoic presence guards the mysteries of time.

TIME TRAVELLER

(VoiceOver)

What cataclysmic event befell this world? The rise of machines, the fall of humans... now only remnants remain.

EXT. TIME TRAVELLER'S FLASHBACK - DAY

In a vivid flashback, the Time Traveller is seen delving into ancient myths and legends, unearthing the tales of the Tuatha Dé Danann.

EXT. SLIABH AN IARAINN - DAY

The Time Traveller's face displays a mix of sadness and determination. She reaches a resolution within herself.

TIME TRAVELLER

(whispering)

Though the past cannot be changed, the future can be shaped. I shall ensure a world where humanity thrives once more.

She activates her PORTAL DEVICE, its energy crackling in the air.

With one last look at the mountain, the Time Traveller steps through the portal, disappearing into the unknown.

EXT. SLIABH AN IARAINN - DAY

The mountain stands silent, as if holding the secrets of bygone eras.

FADE OUT.