

**The Unruliness of Matter:  
a weaving of affective, sensory, conversational, and kinky  
algorithmic grids**

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## DECLARATION

This Dissertation is in partial fulfilment of the requirement for Doctor of Philosophy at the Royal College of Art, London.

I confirm that the work presented in this thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis. During the period of registered study in which this thesis was prepared I was not registered for any other academic award or qualification. The material included in this thesis has not been submitted wholly or in part for any academic award or qualification other than that for which it is now submitted.

A handwritten signature in dark purple ink, consisting of a large, fluid loop followed by a horizontal stroke and a small dot at the end.

Despina Papadopoulos  
January 24, 2025



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*To Cleopatra & Angelo—complicated, unruly, unconventional— thank you.*

## Abstract

The *Unruliness of Matter* looks at ways in which complexity, unpredictability, sensuality, and a vibrant materiality can be introduced into algorithmically driven sensing systems. The current proliferation of technological systems assumes that matter, the experience of being human and agency are calculable, indexical and goal oriented.

In response, through three distinct material investigations, this thesis develops a novel framework for reconceptualizing human-machine assemblages. Each investigation constructs its own grid: an affective grid emerging through a series of video-essays that explore embodied narratives and radical presence, a sensory-conversational grid manifested in wearable environments woven with sensors and actuators that investigate gestural communication, and a kinky grid of photographic assemblages in conversation with algorithmic pattern recognition. Together they form a polymorphous framework where affect and encounter become primary—this framework is understood as a porous membrane and atmosphere where pattern moves from repetition to unruliness so that a distributed and disturbed topological surface can emerge. The practice introduces kinetic energy, depth, volume, intensity, vibration, and resonance to typically flattened algorithmic spaces. Through its varied manifestations, it develops an affective modality for representational practices and examines how the symbolic turns literal in encounters with materiality and technology, exposing the epistemological and ontological bearings embedded in algorithmic logics.

*The Unruliness of Matter* charts a progression from an intimate relationship with the self and its immediate surroundings where an atmosphere is established, to a relationship of self with a proximate algorithmic other through embodied and gestural machine learning architectures in the form of two wearables, and finally to a direct and ongoing conversation with the algorithmic 'they'—plural yet singular, disembodied data aggregates consuming vast amounts of energy, both literally and psychically, turning atmosphere into a consolidated environment driven by economic infrastructures.

In an urgent recapitulation of the paradigm shift that transverses biology, physics, and philosophy today, the making of the artifacts in the practice is undertaken as a series of encounters that introduce a polymorphous sensibility for describing technological affect. Each chapter weaves its own grid— affective, sensory-conversational, and kinky—coming together to propose a polymorphous framework that suggests new ways for imagining human-machine assemblages. This framework maintains the richness and complexity of human experience while engaging with

technological systems in more nuanced, transformative ways. Through these material encounters and their deliberate kinking of established patterns, the work demonstrates how algorithmic systems might be recrafted from processes of reduction into expansive sites of co-creation and possibility.

**Keywords:** affect, encounter, embodiment, grid, transmodality, pattern recognition, radical matter, weave, co-creation, algorithm, human-machine assemblages, interpretability, algorithmic ethics

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The Brain—is wider than the Sky—  
Emily Dickinson

## Pre-ample\*



Figure 1: *LoveJackets* (1995)

In 1995 I made several pairs of jackets where each one emitted and polled for a particular signal. Once the pair found each other, in a 10 feet distance radius, facing each other, the two started beeping in a call and response conversational tone, never at the same time, emitting a sound akin to crickets mating, and a pattern of LEDs blinked in unison to the sound. Each jacket only responded to its unique pair. The technology used was basic: an infra-red receiver and transmitter, a PIC chip (Programmable Interrupt Controller; a precursor to Arduino) that controlled the LEDs and speaker output and sent out the ‘bits’ of code that allowed the pairs to find each other.<sup>1</sup> The components were as miniaturized and seamlessly integrated into the garment as possible but because of the material limitations of the time, hacked together

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<sup>1</sup> The Arduino was developed in 2005 as an open-source project with the goal to make microcontrollers more accessible to the general public and to provide a low-cost way for students and artists to create interactive devices. Today it is widely used as a prototyping platform by artists, students, and corporations alike.

with salvaged headphone wires for connecting the various components, and a lot of heat shrink-tubing, hot glue, electrical, paper, and duct tape. The *LoveJackets*, in their proto-technology simplicity and with their 9 Volt replaceable battery pack, amazingly, still work today.



Figure 2: Detail of *LoveJackets* circuit and components

While the *LoveJackets* aimed to explore social interactional patterns and institute new ones, they also elaborated on ways in which technology could seamlessly be integrated in garments to create a type of second skin, an interactive interface between the body and its exteriority, but also to explore new materials and their expressive potentialities. The aim of the *LoveJackets* was not to create ‘cyber’ garments but use technology in surprising, poetic, and innovative ways and place emphasis not on the technology but on its uses and how it could initiate serendipitous and unexpected encounters. Infra-red was used both to accentuate the possibility of communication through an invisible spectrum, making visible the invisible energy forces that surround being, and because of its inherent limitation: infra-red only works in ‘line-of-sight.’ The two wearers had to literally ‘see’ each other for the *LoveJackets* to be activated.

1995 was a time when technology was viewed with optimism, fascination and unbridled curiosity about what was to come, fascination with the potential for using technology to question notions of identity and belonging, the boundaries between human and non-human and approaching technology as a vehicle to overcome dualities and engage with new

epistemological and ontological models, best exemplified in Haraway's seminal *Cyborg Manifesto*, originally published in 1985 in the *Socialist Review*.<sup>2</sup>

The *LoveJackets* were indeed questioning such boundaries and potentialities but were also an exploration of how art practices could function as props and prompts to interrogate emerging relationships with technology, how embodied artifacts could function as philosophy machines, taking complex concepts and devising ways to manifest and circulate ideas into new and quotidian realms. When people wore them in galleries and museums where they were exhibited, they felt a child-like giddiness, playing games of hide and seek, coming close and turning around, developing spontaneous choreographies.<sup>3</sup> There was something about the utter simplicity of this embodied idea that resonated with audiences.

The *LoveJackets* were inspired by Plato's *Symposium* where Aristophanes discusses the original human nature as one of two parts fused in perfect union before Zeus deliberating with the other gods, in an attempt to humble human pride and make humans 'weaker and more useful [to us] through the increase in their numbers,' cuts them in half.<sup>4</sup> So the *LoveJackets* present that moment of delight and completeness where the two original halves find each other and exalt in their perfect union. The *LoveJackets* felt at the time as the introduction of a type of 'desiring technology.' And indeed, the *LoveJackets* were an exploration of how desire and poetry can be part of technological systems, and therefore resist and subvert subordination to notions of efficiency and reductivism that thirty years later has come to dominate the uses of technology and human-machine assemblages.

What follows is the elaboration of a practice-based research formulated in three parts that brings desire, poetry, and affective encounters to form three intersecting grids that together propose a rethinking of how to engage with technological artifacts and artificial intelligences, and in the process re-situate how affect, and thus selfhood, is understood and altered through its rubbings with technology. These grids are best understood as kinetic and polymorphous energy fields that invite an open conversation between philosophy and technology, making

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<sup>2</sup> Donna Jeanne Haraway, *Simians, Cyborgs, and Women: The Reinvention of Nature* (New York: Routledge, 1991), 149–81.

<sup>3</sup> The *LoveJackets* were part of the following shows: Sartorial Flux, A+D Gallery, Chicago, US, September 7 – October 21, 2006 (catalogue), *Pattern Language: Clothing as Communicator*, Tufts University Art Gallery, Boston, US, traveling summer 2005-winter 2008 (catalogue), *How Smart Are You Dressed Tomorrow?*, NEMO Museum of Science, Amsterdam, NL, November 8, 2004 (catalogue), *Space Odyssey*, Group Exhibition, Eleni Koroneou Gallery, Athens, Greece, October 1995 (catalogue)

<sup>4</sup> Plato, *Plato's "Symposium,"* trans. Seth Benardete (Chicago: University of Chicago Press, 1993), 19.

philosophy a lived and embodied practice. What humans affectively and epigenetically experience, along with notions of authenticity, presence and engagement, bias, transparency, accountability, fluidity and non-binarity are not theoretical constructs but physical encounters that manifest the synaesthetic materiality of ideas explored in *The Unruliness of Matter*.

\* The term 'pre-ample' is used as a neologism – combining the term 'preamble,' that which comes before the introduction proper, here situating the practice both historically and in terms of personal narrative, and 'pre-amp,' the term for the electronic amplifier device that boosts signals to stronger levels, thus making them usable for further processing, in this case boosting the 'signals' that are transmitted in what follows.



## Introduction

*The Unruliness of Matter* is a practice-led tripartite investigation into the pressing encounters between humans and sociotechnical environments and the imprints they leave behind. The role of affect, embodiment, intensity, texture, and depth is spread across each of the three parts of the research and the artifacts it produces, and each investigation takes the next one forward. They all follow the flow of matter in different configurations and adjacencies, opening-up a material space for polymorphous encounters to emerge, creating holes where the multiplicity of meaning can weave in and out, situating encounter as emergence but also as a portal for new imaginaries to occur. Looking at the work as a series of holes, where affect and emotion, the splashing of waves, heat on the body, photos on the wall antagonizing each other—these are holes as pricks and pores through which meaning can be reconfigured, and the poetic imaginary inserted and woven through.

In this weaving, complexity, unpredictability and a vibrant materiality become dimensions of a topological surface where pattern and patterning leap out of binary grids and instead invite algorithmic logics to account for the porous epigenetic membrane that brings memory, ethics, responsibility, materiality, and immateriality together as part of a performative ontology.

The concept of a topological surface allows a move beyond fixed coordinate systems and instead considers how meaning, affect, and materiality emerge through continuous transformation and relationships. Unlike a Cartesian grid with its fixed points, a topological surface can be stretched, twisted, and deformed while maintaining its essential properties much like affect maintains its intensity while moving between different modalities.

*The Unruliness of Matter* is a weave within a weave that progressively creates a narrative structure that moves from video essays to wearable artifacts and then to visual poetics. Fundamentally this weave is concerned with introducing complexity, unpredictability, sensuality, and the unruliness of matter in conversation with algorithmically driven sensing systems that purport that human experience is calculable, quantifiable, measurable, and predictable.

The video essays set the stage and introduce an unruly self as it collides with internal and external forces, entangled with the material theater, establishing affect and the cognitive unconscious as core and constitutive elements. Each video becomes a thread that passes through the heddles of an ontological and epistemological self; the shuttle is thrown back and forth as a self in constant becoming weaves an atmosphere—a mood that is at once ungraspable and material, immersive and spectral—seeking to situate and at the same time expand the limits of being.

The embodied practice of weaving and a collision with novel physical and algorithmic materials, and the encounters these collisions yield, informs and challenges the reductive and mono-dimensional versions of what it is to be human, propagated by technological systems found in Silicon Valley and capitalist-based industry infrastructures.<sup>5</sup> The weave here is literal as in chapter two a material woven with conductive and performance yarns becomes part of a surface that touches the body and seeks to enter in conversation with algorithmic coding. A second wearable artifact looks at markers of aliveness and investigates what an affective entanglement with a programmed ‘creature’ that taunts its user would entail.

These entanglements and artifacts point to the emergence of a new surface or topological environment at both the conceptual/ methodological level but also, and importantly, at the practical level. A hybrid materiality and conversation between visual poetics and algorithmic predictability aims to establish unimagined material arrangements, where the surface itself becomes an expandable, un-intelligible and an ever-expanding topology where affect is reconfigured and negotiated between human and machine to queer such topology. This topology is now porous, prickable, reconfigurable, pushing to expand its mathematical calibration to find holes where meaning can be woven in new configurations. In chapter three, this takes the form of a series of photographic assemblages that represent an intimate, private, and vulnerable interiority that is ‘fed’ into large language models (LLMs) as part of an affective promptology, querying the models and asking them to participate in the creation of new narratives.

In response to normative and calculable approaches to information and matter, the Deleuzian plane of immanence is evoked as the ‘plane that secures conceptual linkages with ever increasing connections,’ where concepts are events that the plane of immanence holds together. The video essays, the wearable artifacts, and the networks of thought that appear in the photographic assemblages in chapter three all manifest this plane.<sup>6</sup> As ‘the nonthought within thought,’ the plane of immanence provides a space for embodied experimentation and infinite movement without seeking a final destination, thus positing a direct rebuttal to the goal-

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<sup>5</sup> Best exemplified by GAFA, the acronym used for Google, Apple, Facebook (now META), and Amazon, to describe the companies as a power complex that dominates the tech industry market. Now this would have to include Elon Musk’s SpaceX, and the increasing political and geopolitical power that both he and his companies yield – see: Joscha Abels, “Private Infrastructure in Geopolitical Conflicts: The Case of Starlink and the War in Ukraine,” *European Journal of International Relations* 30, no. 4 (December 2024): 842–66, <https://doi.org/10.1177/13540661241260653>.

<sup>6</sup> Gilles Deleuze and Félix Guattari, *What Is Philosophy?*, European Perspectives (New York: Columbia University Press, 1994), 37.

oriented environments that algorithmic systems seek to establish.<sup>7</sup> Deleuze's analysis of folds as 'derivative forces' that materialize an infinite spiritual force informs the way the encounter is understood and experimented with in the practice when physical and algorithmic materials collide.<sup>8</sup>

Golding's work on radical matter is a foundational pillar on how *The Unruliness of Matter* unfolds, as is her introduction of an ana-materialism that escapes the traps of binarism while introducing a morphogenic logic of expenditure that sculpts the encounters between human and machinic affectivity discussed in what follows.<sup>9</sup> Similarly, Golding's elaboration of the encounter as a discursive field which establishes 'new forms of horizons, fields and intensities' is primary in escaping the 'binaric zero-sum,' and is used to situate much of the field of inquiry and practice in the work, as is her introduction of radical matter and emergence that resists the divide between science and art and moves away from traditional notions of (new) materialisms.<sup>10</sup>

The three chapters follows the practice as it was developed in chronological order moving from work that demanded low-energy consumption and resources, to the development of increasingly more complex systems where more and more resources, collaborators, known and in proximal conversation, or outsourced to the cloud and data centers that 'compute' and produce algorithmic conversations, were involved.

Roughly this translates to an engagement with affect that starts with an intimate and unmediated dive into the cognitive unconscious and the elaboration of an affective self that uses technology (an iPhone camera) as an omnipresent witness that 'frames' the affective experience, and then adds algorithmic conversations, at first embodied and gestural, and then immaterial and spectral but still very much grounded and informed by the materiality of affective encounters and the material infrastructures behind the data inputs that account for algorithmic outputs.

The closer the practice gets to algorithmic entanglements the more the intensity of the affect and the connection between atomic and psychic materiality recedes to the background. The existential threat that AI poses, the thesis argues, is not that AI will supersede human

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<sup>7</sup> Deleuze and Guattari, 59.

<sup>8</sup> Gilles Deleuze, *The Fold: Leibniz and the Baroque* (Minneapolis: University of Minnesota Press, 1993), 122.

<sup>9</sup> Johnny Golding, "Ana-Materialism and the Pineal Eye: Becoming Mouth-Breast," in *The Next Thing: Art in the Twenty-First Century*, ed. Pablo Baler (Fairleigh Dickinson University Press, 2013).

<sup>10</sup> Johnny Golding, "The Courage to Matter," in *Data Loam: Sometimes Hard, Usually Soft: The Future of Knowledge Systems*, ed. Johnny Golding, Martin Reinhart, and Mattia Paganelli, Edition Angewandte (Berlin: De Gruyter, 2021), 484.

intelligence leading to their extinction but that humans will become as mono-dimensional and binary as AI systems to facilitate a better orchestration between the two.<sup>11</sup>

The move from Chapter 1 to Chapter 3 is, in charting the progression, a move from an intimate relationship with the self and its immediate surroundings where an atmosphere is established in Chapter 1, to a relationship of self with a proximate algorithmic other through embodied and gestural machine learning architectures in the form of two wearable artifacts in Chapter 2, and finally, in Chapter 3, to a direct and ongoing conversation with the algorithmic ‘they,’ plural and yet singular, disembodied data aggregates consuming vast amounts of energy, both literally and psychically, turning now atmosphere into a consolidated environment driven by economic infrastructures.

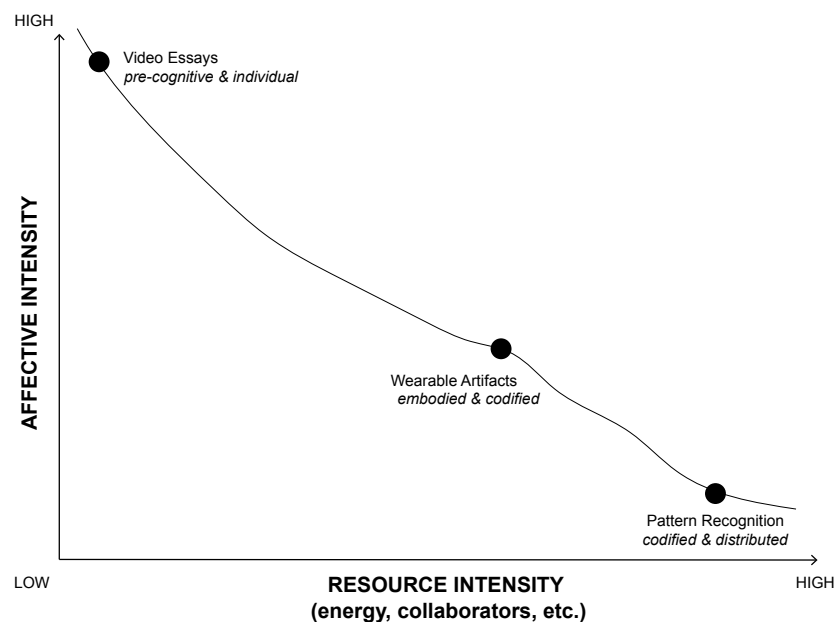


Figure 3: Diagram of chapter progression on energy and affective resonance distribution\*<sup>12</sup>

<sup>11</sup> The Center for AI Safety released the following statement in May 2023, the statement was signed by many key players in the field, including the leaders of OpenAI, Google and Anthropic, as well as two of the so-called “godfathers” of AI: Geoffrey Hinton and Yoshua Bengio: “Mitigating the risk of extinction from AI should be a global priority alongside other societal-scale risks such as pandemics and nuclear war.” <https://www.safe.ai/work/statement-on-ai-risk>, accessed June 20, 2024.

<sup>12</sup> While the vast amounts of energy required to train and deploy AI models is extensively documented, this diagram places emphasis on the relationship of affect to resources and how affective intensity can require very little energy compared to the distributed intelligence of AI models. A detailed discussion of AI’s ecological footprint, although relevant, is outside the scope of the overall thesis. See: Cornelia Walther, “The Hidden Cost of AI Energy Consumption,” *Knowledge at Wharton* (blog), accessed December 29, 2024, <https://knowledge.wharton.upenn.edu/article/the-hidden-cost-of-ai-energy-consumption/>.

In their totality, all three chapters explore the epigenetic environment that brings together biological and sociotechnical systems, memory, viscera, historicity and futurity; a membrane, or epidermis of responsibility that calls for an astute interrogation and re-imagination on how encounters with technology participate in the making of an affective self and the social ramifications that this entails or activates. Like a topological surface, the epigenetic environment here is characterized by its plasticity and ability to be transformed through encounters and interactions with technology in ways that resists algorithmic reduction and creates complex patterns of meaning and affect that cannot be reduced to simple predictive models.

Chapter one, *Jumping into the Affective Abyss*, explores this epigenetic environment in short videos sketches that introduce affect as a spontaneous and embodied narrative materiality with radical presence and technological mediality in entangled conversation. Here the encounter is between the self and its immediate environment in a solo practice that involves no collaborators and minimal use of technological tools, other than the ubiquitous lens of a smart phone, and in two cases minimal editing. All the videos that make up this part of the practice are unmediated, unscripted responses to the material theater, a fascination with the folds and crevices of being, of creatures that participate ontically in the making of the self, with the affordances that engineered materials allow, and with the constant swirl of motion that unites all matter.<sup>13</sup>

They are in turn an uncannily precise re-enactment of a lucid dream (*Untitled*), a reconfiguration of the material surface where frustration and trauma can be deposited and supported by the atomic reconfigurability of engineered matter (*Banging my Head on the Wall*), a fascination with the choreographed and responsive metonymy of the frame while observing and being enmeshed with flies and ants (*Sunday Lunch* and *My Ants*), and how technology can render the incessant vibrationality of the human body visible while at the same time turning it into a technical object (3.6-14.0 Hz). The videos seek to capture the immediacy and intensity of affective experiences, resisting easy narrativization or cognitive interpretation and are used as studies and sketches that help delve into the key properties of affect. Pre-cognition, embodiment, intersubjectivity, motivation and action, meaning-making, temporality and ephemerality, creativity, vulnerability, individuality and adaptability are all clearly delineated and captured in all of the video essays: their affective intensity is immediate, palpable, a certain

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<sup>13</sup> Thomas Nail, *Lucretius I: An Ontology of Motion* (Edinburgh: Edinburgh University Press, 2018), 72.

purity of intent not obstructed by machinic logics, weaving an affective grid, the first of the three developed in the thesis.

The chapter also brings tensegrity, epigenetics, and neuroplasticity as additional co-ordinates into the polymorphic framework that the *Unruliness of Matter* seeks to establish.

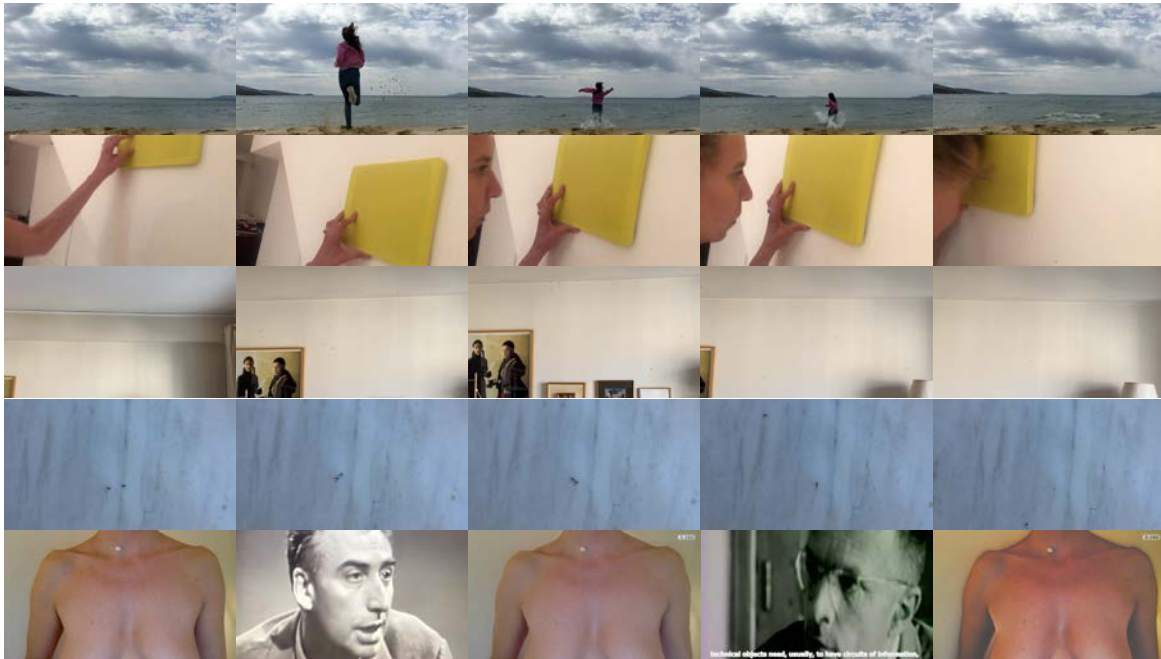


Figure 4: *Witness to the Unfolding of a Radical Presence*: a weave of video stills from *Untitled*, *Banging my Head on the Wall*, *Sunday Lunch*, *My Ants*, 3.6-14.0 Hz

Together, these videos sketches develop the basis for an interdisciplinary approach to research that combines insights from philosophy, biology, material engineering, neuroscience, art, and autobiography and blurs the boundaries between domains and practices, much like the boundaries between different forms of being are blurred themselves and their emergent relationships best understood as ontologically performative and sensual.<sup>14</sup>

Chapter two, *The Encounter and the Grid*, looks at intricate weaves and wearable environments embedded with sensors and actuators that explore skin as interface while questioning sensor based haptic computational communication in its ability to account for the indeterminacy and fluidity of gesturality. Exploring the historical and conceptual intersections between weaving, computation, and algorithmic thinking, the chapter proposes a reimagining of the grid as a multidimensional space that encompasses physical texture, digital information, sensory feedback, and human interaction.

<sup>14</sup> Andrew Pickering, "Emergence and Synthesis: Science Studies, Cybernetics and Antidisciplinarity," *Technoetic Arts* 6, no. 2 (August 21, 2008): 127–33, [https://doi.org/10.1386/tear.6.2.127\\_1](https://doi.org/10.1386/tear.6.2.127_1).

This entails repositioning pattern beyond visibility and account for tactility, temporality, and the rhythms of interaction. It explores the concept of memory and its relationship to affect for both machine and human through engagement with temporality, atonality, rhythm, and repetition.

Intertwined in this exploration is both a rethinking of materials and their multiversality, introducing the ‘quantum atmosphere’ that the physicist Frank Wilczek describes as a thin aura, or zone of influence, that surrounds materials that manifests their fundamental quantum properties.<sup>15</sup> Atmosphere emerges as an important concept and one that is posited against the notion of environment. Atmosphere, as ephemeral and immersive, as that containing and dispersing energy in unpredictable and undefinable ways is what an enmeshed technological system would look like as opposed to the grounded and delineated qualifications of technological environments.

Two wearable artifacts made of intricate materials that sit closely to the body, heat up, at times mimic breathing and each connected to a machine learning model are presented as probes that envelop the body and in the process of developing them, raise epistemological and ontological questions about human-machine assemblages. They are used to interrogate a languaging and conversation of sorts between human and machine, the limits of communication between the two species, the kinds of bonds that can be created and how affect is passed from human to machine. By breaking down the machine learning model process, starting with the ontological ‘what is’ in the define phase, moving to the epistemological ‘this is’ in the capturing phase, into an onto-epistemological ‘this is,’ in the training phase, and finally to a performative ontology of ‘is’ in the execute phase, an interrogation of the fundamental affordances of human and machinic performativity is explored, thus repositioning the onto-epistemological terrain of both human and machine.

Chapter two engages with hybrid materialities, embodied cognition, and the emergence of a sensory-conversational grid. It investigates the possibility of developing new models for human-machine interaction that resist technological functionalism without losing grip on meaning. This reimagining of the grid and pattern offers a pathway toward more nuanced, playful, and transformative relationships with technological artifacts and artificial intelligences, while also highlighting the limits and immaturity of technologically driven embodied interactions.

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<sup>15</sup> Marcus Woo, “‘Quantum Atmospheres’ May Reveal Secrets of Matter,” *Quanta Magazine*, September 25, 2018, [www.quantamagazine.org/quantum-atmospheres-may-reveal-secrets-of-matter-20180925/](http://www.quantamagazine.org/quantum-atmospheres-may-reveal-secrets-of-matter-20180925/).

In the final chapter, *Pattern Recognition: Between the Poetic and the Algorithmic*, grid and pattern recognition are reframed as fluid portals that invite complexity, dimensionality and unpredictability to algorithmic systems, replacing multimodality with transmodality, foregrounding an unruly self, defined by constant transformation, as ultimately is intelligence itself, be it human or artificial, liberating it from the ‘the prostheses of normativity and stereotypes’ that currently underscores algorithmic architectures.<sup>16</sup>

*Pattern Recognition: Between the Poetic and the Algorithmic* explores an approach to multimodality by challenging, initially a custom-made machine learning model, and later Claude, Anthropic’s multimodal large language model, to engage with radical subjectivity, memory, emotion, and embedded information that includes surface, texture, contextual data, and material resonance. A series of image assemblages are composed that at times include computer screenshots, photos of photos that are printed on a variety of papers each carrying its own material resonance, and in a second instance labeled with emotional vectors and narrative annotations as training data. Both the assemblages themselves and the way they are used to probe machinic interpretability introduce a kinkiness, a subtle deformation and exploration of visual poetics, and form the last grid in the work, the kinky grid.

These layered assemblages create a multimodal topology that pits mechanistic interpretability and machinic neural networks against a human neural network. In these series of images, instances of non-conscious cognition and surface encounters emerge—both *within* the images *and* as they are photographed on the wall, creating an infinite canvas. This introduces a dynamic materiality to assemblages in opposition to the vectorized images void of context and emotional resonance that populate the model garden.<sup>17</sup>

The reference to non-conscious cognition is borne out of the mostly unmediated use of the technological tools, as the photos are taken on an iPhone, iPad, or captured as computer screenshots and then printed and taped on the wall, bringing a materiality to the digital realm. These images are enlarged and reframed on the device’s screen and screenshot before printing them, eschewing the mediation of software, aiming for an unmediated process, and following

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<sup>16</sup> Catherine Malabou, *Morphing Intelligence: From IQ Measurement to Artificial Brains*, trans. Carolyn Shread, The Wellek Library Lectures in Critical Theory (New York: Columbia University Press, 2019), 139.

<sup>17</sup> “Model Garden in the Google Cloud console is an ML model library that helps you discover, test, customize, and deploy Google proprietary and select OSS models and assets,” accessed February 24, 2024, <https://cloud.google.com/model-garden?hl=en>.



the logic of the image as an ephemeral and compulsive practice. In this process of unmediated materiality ‘cognition, interpretation, and choice’ are entwined with technological appendages.<sup>18</sup>

What is at stake here is the future of images, their materiality, their relationship to memory, to narrative, their potent multiplicity, and how ‘the image of thought’ does not entail only a recognition of the object, but includes the values and affective intensities that form relationships with objects.<sup>19</sup> These affective intensities are much the result of what Deleuze calls the ‘fortuitousness or the contingency of the encounter,’ which makes it possible for multiplicity, new thoughts and material arrangements to emerge.<sup>20</sup>

These images are created as training data sets or prompts, part of a machine learning model that looks at the emotional and narrative connections, as well as their material implications. The interest in introducing emotion in this way is part of a move away from the idea of symbiosis, and toward an exploration of a sympoietic relationship to technology and in order to ‘trouble’ it.<sup>21</sup> The main motivation in exploring this sympoiesis is to introduce emotion as affect, and as a category that defies taxonomical tabulation, better understood as a tentacular relationship between intra-acting agents.<sup>22</sup>

To be clear, the aim here is not to create a machine learning model *capable* of emotion. Instead, the intention is to introduce an expanded affective sensibility that can then participate in a more nuanced and multidimensional representation of human experience. Technology and the machine learning models that increasingly occupy and transverse all aspects of human agency are becoming the ‘other’ that assures and defines intimacy, vulnerability, and subjective emotions. For this subjectivity and intensity that is contained and encapsulated in private feelings to be maintained and celebrated as part of the plural nature of being, machine learning models should be exposed to the variability—understood by the model as variables and interconnected multimodalities—and the material attributes that emotions contain.

Hannah Arendt already saw that while the intensification produced by the public performance of an inner life can enrich private experiences it also undermines the very assurance of the reality of the edges of the world.<sup>23</sup> In the process, the ‘enlargement’ of the

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<sup>18</sup> N. Katherine Hayles, *Unthought: The Power of the Cognitive Nonconscious* (Chicago ; London: The University of Chicago Press, 2017), 203.

<sup>19</sup> Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton (London: Continuum, 2004), 135.

<sup>20</sup> Deleuze, 145.

<sup>21</sup> Donna J. Haraway, *Staying with the Trouble: Making Kin in the Chthulucene* (Durham: Duke University Press Books, 2016).

<sup>22</sup> Karen Barad, *Meeting the Universe Halfway: Quantum Physics and the Entanglement of Matter and Meaning* (Durham & London: Duke Univ. Press, 2007), 33.

<sup>23</sup> Hannah Arendt, *The Human Condition*, 2nd ed (Chicago: University of Chicago Press, 1998), 50.

public realm, here reframed as machinic models that calculate and represent collective versions of reality and participate in the development of an affective self, is unable to 'harbor the irrelevant,' and thus null small moments, individual and individuating experiences.<sup>24</sup>

Finally, unruliness is expounded, investigated, and developed in the practice as a topological surface where the edges are alive and the surface infinitely expanding. All three chapters are ways of looking at the body and its relationship to the material theater, that now includes algorithmic logics and conversations, moving from low-tech to high-tech interlocutions. At the same time, this surface with malleable and fluid edges that move on all directions seeks to bring a purity into interactions with technological systems and introduce a polymorphous materiality that can poke holes through which the full spectrum of human experience, including its ambiguities, contradictions, potentialities, desires, grief, pain and indeterminate angst can be rematerialized: 'the task of the artist is to make the holes visible,' writes Jonathan Lahey Dronsfield in the booklet, *The Materiality of Theory*.<sup>25</sup> What follows is a series of holes that seek to materialize theory as part of an atmosphere that binds human, animal and machine, situating the encounter as an emergent property between entities that each engage with affect differently, while placing ethics in the center of a performative ontology and a renewed disposition towards care, accountability, and action.

By rethinking the concept of the grid as dynamic, evolving systems that challenges traditional notions of where technology ends and the human begins, this approach invites a new understanding of the encounter between human and machine as an embodied, multiversal, and inherently performative space. The three grids that are developed in what follows, an affective grid in chapter one, a sensory-conversational one in chapter two, and finally, a kinky grid in chapter three, weave together a polymorphous framework that is proposed as a way to escape a dystopian and mono-dimensional relationship to technology and human-machine assemblages.

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<sup>24</sup> Arendt, 55.

<sup>25</sup> Jonathan Lahey Dronsfield, "Art Philosophy Differ- End, and a Note on the Materiality of Theory," in *Materiality of Theory* (Birmingham: Article Press, 2011), 45. Brought to my attention by Zowie Broach during our conversation on holes.

## Chapter 1: Jumping into the Affective Abyss / Genealogy / Autofiction

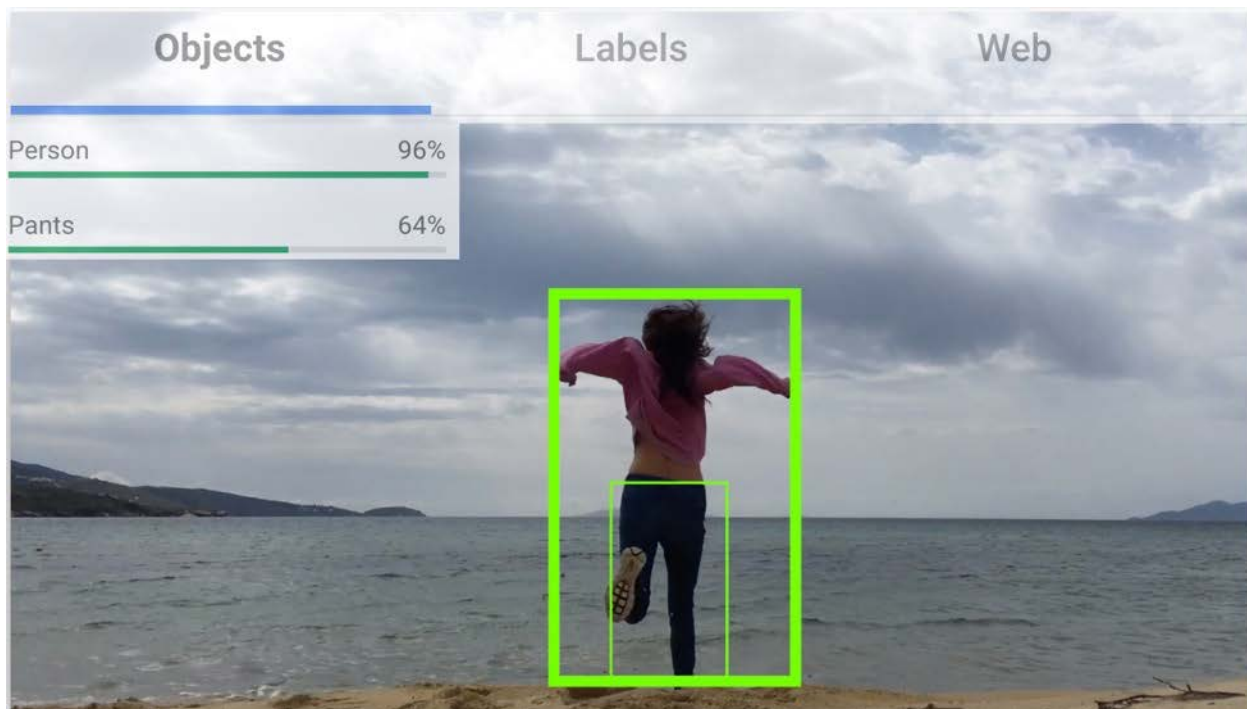


Figure 5: Still from *Untitled* interpreted by Google Image Recognition Labelling System in 2019

Playing witness to the expanding boundaries between being and becoming, self and other, mind and body, and a fundamental engagement with the world, *Jumping into the Affective Abyss (Autofiction)*, uses a series of video sketches as the platform that grounds and expounds the main themes and concerns in *The Unruliness of Matter*. While the artifacts developed in the rest of the practice and elaborated upon in the ensuing chapters are premediated, extensively planned, and involve collaborators, which itself is explored as part of the work, the videos deal with an exteriorization of the cognitive unconscious, autobiography, and memory which the practice argues remains indecipherable in its multiplicity and affective intensity. They manifest the inherent performativity of an unruly self, part of a world in constant becoming, and are used as input to reflect on the properties of synergistically evolving and inhabited human-machine assemblages.

These video sketches function as investigations into the fundamental dynamics that inform the construction of complex techno-social systems and their relationship to the formation of a renewed understanding of unpredictability, affect, emergence and the encounter. While there is an inherent physicality and materiality in video art, both in terms of the pixelated points that make up the image and the light that transposes that image, the video sketches developed

as part of the practice are not approached as video art per se but as research studies that inform ‘outcomes that are always encoded as part of a sensory system.’<sup>1</sup>

The videos described in this chapter are approached as the first of the three grids of a tripartite practice; in this first instance the grid takes on framing, autobiography, immediacy, observation, and affective states borne out of an existential yearning, a curiosity and desire to understand the psychic and sensory dimensions of encountering the world in all its material complexity. These aspects become nodal points that begin to form a polymorphic and elastic framework that seeks to transcend the grid of binaric logics and reformulate it as an affective transmodal epigenetic epidermis.

Bodies (human, ants, flies) are woven and knotted together to celebrate their entanglement with the spatiotemporal fabric of the material theater and the plastic memory they hold as they transform and weave allotropic encounters.

Matter, as what Simondon understands as plasticity, along with its capacity for openness and transformation follows all the embodied narratives that make up these video sketches.<sup>2</sup> Technology is understood here as atmosphere as opposed to an environmental infrastructure, and the way these videos are produced—on an iPhone, single shot, no tripod, no or minimal editing—weaves an atmospheric architecture which is explored in later chapters and rethinks how algorithmic systems can engage with the unruliness and reconfigurability of matter, including that of a self in constant becoming. The process, while deliberately working with the readiness-at-hand of technological *i-pparatuses*, eschews technology as the extension of an embodied mind and instead approaches it as an ever-present witness to the unfolding of a radical presence.<sup>3</sup>

By introducing affect as a spontaneous and embodied narrative materiality where radical presence and technological mediality are entangled in conversation, these videos also elaborate on the Lucretian notion of ethics as something that is borne not out of human intellect and

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<sup>1</sup> Alex Kitnick, “NO RESOLUTION: VIDEO ART IN AND AROUND THE CONTEMPORARY,” *Artforum* (blog), May 1, 2023, <https://www.artforum.com/features/alex-kitnick-on-video-arts-elusive-past-and-tenuous-future-252652/>.

<sup>2</sup> Arne De Boever, ed., *Gilbert Simondon: Being and Technology* (Edinburgh: Edinburgh University Press, 2012), 45.

<sup>3</sup> *i-pparatuses* is a neologism I propose that combines the *I* of the self with the *i*- prefix of Apple devices used in both chapter 1 and 3. These *i-pparatuses*, contrary to Clark and Chalmers' extended mind thesis, do not function as extensions of cognition. Despite their ubiquity and role in self-making, they operate through a different mode of technological engagement than the integrated cognitive tools Clark and Chalmers describe. Andy Clark and David Chalmers, “The Extended Mind,” *Analysis* 58, no. 1 (1998): 7–19.

applied to the world, but as shared with all of nature since it is based on the constant swirl of motion, and therefore an action that happens in and as part of the world.<sup>4</sup>

While in the chapters that follow this transformation of matter directly involves technology in the form of sensors, actuators, machine learning and algorithmic promptology, the videos in this series in their low-tech, low energy consumption, deal with the singularity of a self in a process of what Rosalind Krauss terms 'self-encapsulation,' which she deems as an ever present property of video art where body and psyche are immersed and captured in a continuously renewed image of the self.<sup>5</sup>



Figure 6: Video still, *Untitled* (2019), digital video, 7 seconds

This image of the self is partially captured in [Untitled](#). A fully clothed body jumps into the sea. Sky, clouds, sand, land formations in the distance. A clear horizon, lines demarcating the earthly elements, environment and atmosphere subsume each other, the human body part of this grid of being in the world. A shallow jump. The body does not reappear. The entire video lasts seven seconds. Ominous, playful, joyous, performative, undecipherable. The video is shot unrehearsed in a single take on an iPhone lodged on a stone at the beach. It is a perfect and precise re-enactment of a lucid dream taking place at the beach where countless summers

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<sup>4</sup> Thomas Nail, *Lucretius II: An Ethics of Motion* (Edinburgh: Edinburgh university press, 2020), 2.

<sup>5</sup> Rosalind Krauss, "Video: The Aesthetics of Narcissism," *October* 1 (1976): 54, <https://doi.org/10.2307/778507>.

were spent as a young child. It is not the cognitive unconscious but an accurate, embodied enactment of an image of thought and epigenetic atmosphere. Thought and memory as affect and presence, thought as an encounter between the clothed body that already participates in the semiotics of clothing and its desire to be immersed in the womb of the world. *Untitled* introduces intensity as an integral part of experience and affect, as ‘immanent to matter and to events,’ as that which binds mind to body and escapes the bifurcation between the two.<sup>6</sup> This recreation of a lucid dream, of a body becoming engrossed in nature recalls Thomas Nail when he writes ‘sleep, dreams, desire, and sex are not inseparable from ethical practice and the nature of things.’<sup>7</sup>

Elizabeth Grosz writes that “[W]e ‘become ‘divine,’ to the extent that humans can, through affect rather than thought,” and invokes Nietzsche’s notion of force as ‘unconscious and bodily’ and it is this approach to affect that is played out as part of *Untitled*.<sup>8</sup> An exquisite corpse of sorts, *Untitled* is a reconfigurable psychoanalytic sequence that resists sense making and yet is decipherable in the crevices of performativity and surrender, a performative ontology that completely evades primitive machine learning data taxonomies: ‘viewing the sea as simple and finite, as an engineer might, is animistic and primitive, whereas viewing it as a source of endless possibility is advanced and human’ the physicist Robert Laughlin writes, and in *Untitled* this endless possibility is made manifest and grounds the material investigations in the following two chapters.<sup>9</sup>

A different type of surrender takes place in the video [\*Banging my Head on the Wall\*](#), where a new ontological potentiality for technology is rehearsed as a supportive/supporting surface for the enactment of personal and cultural trauma and anxiety. While *Untitled* was driven by a desire to accurately re-enact a visual foregrounding of a self perplexed by the endless possibilities of being in the world and negotiating its place in it, *Banging my Head on the Wall* follows a different course.

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<sup>6</sup> Brian Massumi, “The Autonomy of Affect,” *Cultural Critique*, no. 31 (1995): 94, <https://doi.org/10.2307/1354446>.

<sup>7</sup> Nail, *Lucretius*, 208.

<sup>8</sup> Elizabeth Grosz, *The Incorporeal: Ontology, Ethics, and the Limits of Materialism*, Reprint edition (Columbia University Press, 2018), 93.

<sup>9</sup> Robert B. Laughlin, *A Different Universe: Reinventing Physics from the Bottom Down* (New York: Basic Books, 2005), 15.



Figure 7: Video still, *Banging my Head on the Wall* (2019), digital video, 50 seconds

Entirely unplanned and responding to an impulse while writing this very dissertation while listening to the Brahms Requiem, *Ein deutsches Requiem O. 45: VII. Selig sind die Toten* (*Blessed are the dead*) on the radio, this act of banging one's head on the wall is made possible because a pliable, tensegrity-like polymer based material engineered to absorb impact and transform it into a new type of actuality was available in the studio.<sup>10</sup> Tensegrity is a type of geometry and a property that exists in the human body in the form of a networked system that takes mechanical energy and distributes it across the living matrix and converts shocks, psychic or mechanical, into 'information rather than damage.'<sup>11</sup> 'Traces can change their meaning,' Malabou writes when she looks at neuroplasticity as a way to unlock freedom and creativity instead of a materialist and reductivist account of the self and identity, and here the traces of trauma change their meaning as the body channels information in new directions and pathways.<sup>12</sup>

<sup>10</sup> While the term was coined by Buckminster Fuller to describe self-tensioning systems that negotiate between tension and compression, the term has been used to describe and better understand biological systems and the development of new materials – see: K. J. Pienta and D. S. Coffey, "Cellular Harmonic Information Transfer through a Tissue Tensegrity-Matrix System," *Medical Hypotheses* 34, no. 1 (January 1991): 88–95, and "New Materials Exhibit Split Personality," accessed September 22, 2019, <https://www.caltech.edu/about/news/new-materials-exhibit-split-personality-85191>.

<sup>11</sup> James L. Oschman, *Energy Medicine: The Scientific Basis*, Repr (Edinburgh: Churchill Livingstone, Elsevier Limited, 2002), 64.

<sup>12</sup> Catherine Malabou, *What Should We Do with Our Brain?*, trans. Sebastian Rand, 1. ed, *Perspectives in Continental Philosophy* (New York: Fordham University Press, 2008), 77.

Anxiety enacted, rehearsed, embodied and transformed— anxiety without trauma, the performance and its muscular enunciation without a fallout. This is not a moment of inducing self-harm to a body and mind tormented by anxiety and frustration, instead it is a moment that engages with technology and engineered structures as means to rethink how technological environments could support a vulnerable embodied self and become part of a performative ontology. It considers technology as allowing for the possibility of reframing affective encounters with the always in motion materiality of the structures that support the making of an unruly self. The encounter here is one of cognitive dissonance, trying things out to see how the world responds and where a truly adaptive system emerges where material structures and technology can transform encounters between the self and its exteriority. Intensity is here again explored as an embodied and autonomic reaction that is indeed, as Massumi writes in *The Autonomy of Affect*, ‘most directly manifested in the skin-at the surface of the body, at its interface with things.’<sup>13</sup>

*Banging My Head on the Wall* considers technology as an ever-expanding interface that can create new potentialities for the expressivity of matter and meaning-making and elicit ‘new energies and resources’ that move them into another movement or order,’ in what Simondon sees as a process of emergence that involves new ways of channeling technological inventions.<sup>14</sup> As tools and interfaces converge in the advent of algorithmic structures there is the potential for the invention of technological objects and architectures that are able to transcend the initial function of the invented object, surpass its goal and the knowability of its effect and instead leap towards an amplification of an emergent adaptation.<sup>15</sup>

As part of such emergent adaptability it bears to ask what a technology that buffers trauma but still allows for its embodied expression would look like. What happens when materials no longer behave as they are supposed to? What kind of space(s) such cognitive dissonance opens-up? Where is the when (of memory, of the event) of the traumatic experience when the laws of physics as are habitually experienced in the body are upended?

These material affordances and reconfigurability of matter is a key preoccupation in the *Unruliness of Matter* and one that is physicalised in the video *Banging my Head on the Wall*. When I am *Banging my Head on the Wall*, I actively participate in the process of a reassembled materiality, of atoms in motion that enable a visceral, embodied and literal enaction of language

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<sup>13</sup> Massumi, “The Autonomy of Affect,” 85.

<sup>14</sup> De Boever, *Gilbert Simondon*, 44.

<sup>15</sup> Gilbert Simondon, *Imagination and Invention*, trans. Joe Hughes and Christophe Wall-Romana, A Univocal Book (Minneapolis: University of Minnesota Press, 2022), 171–72.



to take place, I can act-out while conserving my intactness, frustration supported by a new materiality, trauma performed and yet deferred. This literal enactment of a phrase of frustration in *Banging my Head on the Wall*, is made possible by the atomic pliability and transformability of matter in the form of an engineered polyurethane kinetic-energy absorbing open cell structure that changes its composition based on the rate of strain— the highest the strain-rate the more conforming the material becomes.<sup>16</sup> The symbolic is here turned literal in encounters with materials and technology, and by the affordances they create when looking at their epistemological and ontological bearings, and how the two, the symbolic and the literal so perfectly align to allow for a performative ontology to emerge. Expression, performativity, and language games, ‘language and the activities into which it is woven,’ are all folded together to create a new plane of inquiry and call into question the assumptions projected on all material surfaces, and as such surface itself, introducing a cognitive dissonance and embodied entanglement with matter that runs throughout all the material explorations in the practice.<sup>17</sup>

What is the trace that the object leaves in the concept once it is materialised? How does the materiality of concept and object reappear in different forms? In the practice these questions are addressed as they follow the ways matter changes, both literally and figuratively. Technology in *Banging My Head on The Wall* is understood as a potentiality and a surface where events take place – the type of affect the event produces reconfigures its material implications and technology as such, and the research seeks to follow how this transformation could take place across the plane of both the material (woven engineered structures in Chapter 2) and the ephemeral and immaterial (pattern recognition and algorithms in Chapter 3; although the algorithmic is now as material as any material). The engineered material that is used in *Banging My Head on The Wall* belongs to a class of materials where components are interwoven and contain no junctions, instead using micro-knots as ‘building blocks’ using an ‘interpenetrating lattice design’ and ‘knotted topology’ as an alternative to ‘interconnected designs’ that outperform ‘monolithic’ designs in terms of resilience, structural integrity, and unique abilities not only in terms of impact resistance, as in the case of *Banging*, but also acoustic and photonic bandgaps, the energy ‘gap’ between the valence and conduction band

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<sup>16</sup> <https://www.rogerscorp.com/elastomeric-material-solutions/poron-industrial-polyurethanes/poron-4701-50>

<sup>17</sup> Ludwig Wittgenstein, *Philosophische Untersuchungen* =: *Philosophical investigations*, trans. G. E. M. Anscombe, P. M. S. Hacker, and Joachim Schulte, Rev. 4th ed (Chichester, West Sussex, U.K. ; Malden, MA: Wiley-Blackwell, 2009), 8°.

where electrons move, as well as tunable thermal response.<sup>18</sup> Here, the gap between valence and conduction is again literalised as it changes the valence of the emotional affect and its hedonic tone. Once again, the atomic materiality is in direct communion with a psychic one.

This knotted topology is present in sailing knots, sutures, the entanglement of DNA, or protein and polymer strands, as the authors of the paper *Knots Are Not for Naught* describe and are inspired by.<sup>19</sup> This highly architected material in its intertwined structure recalls Simondon's process of individuation, a process that takes place *between* matter and form, where matter negotiates its own boundaries of formation through its encounters with other material collisions, physical or mental, matter and information understood as one, an important point for the chapters that follow. This knotted topology is also a materialisation of what Haraway calls 'polyspatial knottings' where symbiotic assemblages come together in an emergent and dynamic manner to create 'heterogeneous webbed patterns' amongst all biological units (but also non-biological) that resist the notion of a 'possessive individualism' to explain emergent behaviours.<sup>20</sup>

In *What is Philosophy?* Deleuze writes that the plane of immanence is 'not a concept that is or can be thought but rather the image of thought, the image thought gives itself of what it means to think, to make use of thought, to find one's bearings in thought.' He continues to write that the plane of immanence is not a method, since every method already presupposes a final destination and predetermined concepts.<sup>21</sup>

In this chapter the plane of immanence, and a move away from predetermination and toward infinite movement is explored through the looped videos that situate emotion and affect as an embodied practice that accounts for mind and body as a fluid interaction, reframes the surrounding environment as an epigenetic material theater that yields intra-active potentialities, and celebrates the playfulness in encounters between concepts and human and non-human bodies, where 'bodily materiality holds the memories and the traces of its enfoldings.'<sup>22</sup>

Here, unpredictability, affect, the poetic, multi-dimensionality, curiosity, along with an interrogation of texture, depth, volume, and motion, are introduced as the fundamental themes

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<sup>18</sup> Widiyanto P. Moestopo et al., "Knots Are Not for Naught: Design, Properties, and Topology of Hierarchical Intertwined Microarchitected Materials," *Science Advances* 9, no. 10 (March 8, 2023): eade6725, <https://doi.org/10.1126/sciadv.ade6725>.

<sup>19</sup> De Boever, *Gilbert Simondon*, 46.

<sup>20</sup> Haraway, *Staying with the Trouble*, 60.

<sup>21</sup> Deleuze and Guattari, *What Is Philosophy?*, 37.

<sup>22</sup> Barad, *Meeting the Universe Halfway*, 383.

the thesis is concerned with and parts of a layered and polymorphic framework that can inform algorithmic ones.

This entanglement with the flow of matter yields a relationality and responsiveness to itself and involves a collectivity that is borne out of sensation, 'like the dance between swallows and insects' as Thomas Nail writes when discussing Lucretius ethics.<sup>23</sup> This dance is literally figured in the video pieces *Sunday Lunch* and *Algorithmically Controlled Homeostatically Motivated Ants*.



Figure 8: Video still, *Sunday Lunch* (2020), digital video, 1 minute, 34 seconds

In [Sunday Lunch](#), at the end of a family gathering, delight, humour and an unexpected dance perfectly performed to the music filling the room as if on cue by a swarm of flies becomes an instance that manifests the poetic and primal entanglement of animal and human. This entanglement brings forth again the ethical engagement between beings in the world, and as elaborated in the subsequent chapters with technology, and develops an ontology that resituates core concept such as 'space, time, matter, dynamics, agency, structure, subjectivity, objectivity, knowing, intentionality, discursivity, performativity, entanglement' introducing the Baradian concept of intra-action and a radical reworking of causality.<sup>24</sup>

As such *Sunday Lunch* celebrates the porous membrane between biological organisms, the me-not-me enmeshment and the complexity and co-ordination of different forms of life. The

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<sup>23</sup> Nail, *Lucretius*, 22.

<sup>24</sup> Barad, *Meeting the Universe Halfway*, 33.

video becomes a meditation on a mutual co-presence, agency, and the material atmosphere that binds human and animal, situating the encounter as an emergent property between entities. This symbiotic relationship and shared delight between observer and the dancing flies, moves away from a 'conception of an insular individuality into one in which interactive relationships among species blurs the boundaries of the organism and obscures the notion of essential identity,' and as part of the research considers how identity and an unruly self is informed by an entanglement with all sorts of organisms, including algorithmic ones in the latter chapters.<sup>25</sup>



Figure 9: Video still, *Algorithmically Controlled Homeostatically Motivated Ants* (2020), digital video, 24 seconds

When introspection is counter-imposed, in a moment of psychoanalytic projection turned observation, as in the case of [\*Algorithmically Controlled Homeostatically Motivated Ants\*](#) the bounds of the frame acquire an intentionality which is easily turned into a constitutive reality and the role of the artist becomes part of the metonymy of the frame. As smart phones now take photos using machine learning and auto-correction techniques that are automatically calibrated for maximum pattern recognition and clarity, the singularity and subjectivity of perception is forsaken for a homogenised and decipherable rendition of reality.<sup>26</sup> In the case of the *Ants* the singularity and subjectivity of perception remains unaltered, and the (unintentional) frame allows for depth and a surface encounter to take place.

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<sup>25</sup> Scott F. Gilbert, Jan Sapp, and Alfred I. Tauber, "A Symbiotic View of Life: We Have Never Been Individuals," *The Quarterly Review of Biology* 87, no. 4 (December 2012): 326.

<sup>26</sup> Kyle Chayka, "Have iPhone Cameras Become Too Smart?," *The New Yorker*, March 18, 2022, <https://www.newyorker.com/culture/infinite-scroll/have-iphone-cameras-become-too-smart>.

The title of the video of the two ants interacting, where one ignores the advances of the other and only moves when the pestering ant exits the frame, serves as a reflection on the nature of ‘life,’ the interaction between organisms and the role of the observer, and a nod to Conway’s *Game of Life*, the cellular automaton devised in 1970 by the mathematician John Conway. Conway inspired by tessellation models and keen to explore unpredictability in cellular automata developed the *Game of Life* where algorithmic emergence unfolds on an *infinite two-dimensional grid* after initial conditions are established and following four basic rules that are all based on *adjacency* (a type of encounter), and where only two states are possible for the ‘organism’ that populates each cell: dead or not dead.<sup>27</sup>

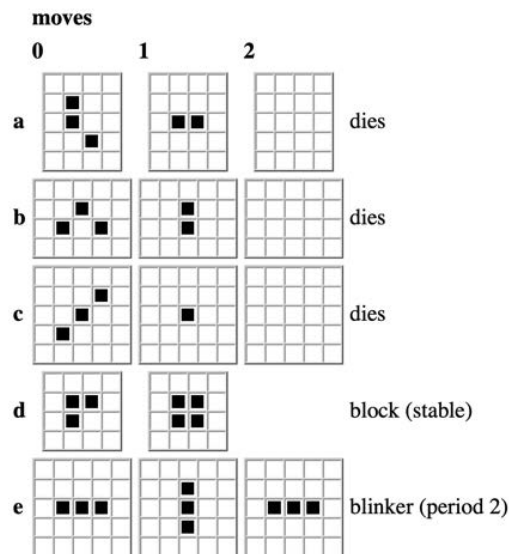


Figure 10: a beginning pattern of three counters in Conway’s *Game of Life* featured in Martin Gardner’s, “Mathematical Games,” *Scientific American* (1970)

The *Ants* act as an observational documentary of sorts that explores notions of emergence, predictability and systems organization and poses the fluency and complexity of the scene as a counterweight and play on the title of the paper *Homeostatically Motivated Intelligence for Feeling Machines* by Man and Damasio.<sup>28</sup> In the paper Man and Damasio argue that feelings in biological organisms emerge from the physiology of life regulation (homeostasis) and that by implementing homeostasis to robots with equivalents to feelings will lead to

<sup>27</sup> Martin Gardner, “Mathematical Games,” *Scientific American* 223, no. 4 (October 1970): 120–23, <https://doi.org/10.1038/scientificamerican1070-120>. Conway’s basic rules are existentially (and mathematically) at once deceptively simple and profound: “1. Survivals: Every counter with two or three neighbouring counters survives for the next generation., 2. Deaths: Each counter with four or more neighbours dies (is removed) from overpopulation. Every counter with one neighbour or none dies from isolation., 3. Births. Each empty cell adjacent to exactly three neighbours--no more, no fewer--is a birth cell.”

<sup>28</sup> Kingson Man and Antonio Damasio, “Homeostatically Motivated Intelligence for Feeling Machines” (Towards Conscious AI Systems Symposium, CA, March 25-27, 2019, n.d.), 4.

machines that can act with self-interest, improved adaptability and resilience. Absent in this formulation of ‘feelings’ and ‘self-interest’ is the notion of the encounter and an affective and performative relationship to other forms of life and instead ‘embodied artificial intelligence’ operates as a closed system. Humour, curiosity, unpredictability and the entangled dance of what Andrew Pickering calls ‘the framings of material agency’ are all absent in the future ‘feeling machines’ that Man and Damasio imagine.<sup>29</sup>

Importantly, the *Unruliness of Matter* takes issue with the application of the term feeling, which includes pain, desire, anxiety, loneliness, grief, fear, all of which are constitutive components of self-interest but foreign states to machinic logics even if they were to be endowed with a sensory apparatus, as Luciana Parisi seems to indicate. Parisi in 2015 saw the combination of ‘deep reinforcement learning’ and ‘high-dimensional sensory inputs’ as providing a ‘relation between sensory inputs and action’ that formulates a mode of thinking with an ability ‘to synthesize the sensory manifold.’ While Parisi is correct in arguing that the ingratiation of algorithmic machine systems in the making of reality demands an alternative approach to reasoning, as they ‘seem to establish a new ontological tension between truth and thought,’ the sensory inputs that machine learning synthesise assume a very different type of ‘sensory manifold’ that the videos sketches and the *Unruliness of Matter* as a whole explore.<sup>30</sup>

Almost ten years after Parisi’s article, the Silicon Valley based company Archetype AI, has developed ‘Newton, a first-of-its-kind AI model that understands the physical world.’ Their proprietary foundation model ‘can perceive and reason about the physical world’ which indeed requires a renewed formulation of what perception and reason entail and the interaction between these faculties.<sup>31</sup>

Posited against this quantification and the ability to ‘unlock the hidden patterns of behavior in the world,’ as Archetype AI states, *Ants* and *Sunday Lunch* invoke what the cybernetician Stafford Beer calls the ‘science of the unknowable’ and where couplings between humans and machines can breed imaginative spaces. These two videos act as a prelude and meditation on ways of approaching technology as exposed in the ensuing chapters where open-

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<sup>29</sup> Andrew Pickering, *The Mangle of Practice: Time, Agency, and Science* (Chicago, Ill.: Univ. of Chicago Press, 1995), 187.

<sup>30</sup> Luciana Parisi, “Automated Thinking and the Limits of Reason,” *Cultural Studies ↔ Critical Methodologies* 16, no. 5 (October 2016): 480, <https://doi.org/10.1177/1532708616655765>.

<sup>31</sup> <https://www.archetypeai.io/>, accessed August 5, 2024

ended experimentation is proposed in stark opposition to the modern urge to achieve domination over nature and each other.<sup>32</sup>

For Beer ‘the world can always surprise us and [that] we can never dominate it through knowledge.’ and this sense of surprise, curiosity and open-ended experimentation is what the video sketches in this chapter establish and elaborate as important coordinates in a grid that brings together knots without junctions.<sup>33</sup>

Beer’s call for a performative information system, geared toward action and not detachable from it, and one that includes nature as a biological system that surpasses our cognitive abilities, is then revisited in the relationship between environment and technology as a system, formed by the materialized human thought and Simondon’s ‘milieu,’ as a system that is ‘synthetically grouping together two or more levels of reality.’<sup>34</sup>

The importance of embodiment is already underscored with second order cybernetics as seen in Varela’s *The Embodied Mind*, where cognition is inseparable from both embodied action and the narratives in which these actions are situated, ‘much like paths that exist only as they are laid down in walking,’ intertwining the traces of the body in space.<sup>35</sup> Varela’s work with Maturana on ‘autopoiesis,’ the self-generating, self-maintaining structure in living systems, is explored in the practice both in *Sunday Lunch* and *Algorithmically Controlled Ants* and in the investigation of emergent behaviours in the chapters that follow.<sup>36</sup> This relationship of biological systems to their environment, cognition and complexity brings Simondon’s notion of milieu in conversation with John Dupré and his rejection of physical reductivism in favour of a pluralistic model of science where culture plays an important part in explaining the multicausality of human behaviour.<sup>37</sup>

Still, algorithmic processes can indeed expose and reveal hidden structures and patterns and participate in the viscosity of a material self and the practice explores how this interweaving and exposition can take place and what type of ontologies it creates.

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<sup>32</sup> Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future* (Chicago ; London: University of Chicago Press, 2010).

<sup>33</sup> Andrew Pickering, “The Science of the Unknowable: Stafford Beer’s Cybernetic Informatics,” *Kybernetes* 33, no. 3/4 (March 2004): 499–521, <https://doi.org/10.1108/03684920410523535>.

<sup>34</sup> De Boever, *Gilbert Simondon*, 141.

<sup>35</sup> Francisco J. Varela, *The Embodied Mind: Cognitive Science and Human Experience*, revised edition (Cambridge, Massachusetts; London England: The MIT Press, 2017), 205.

<sup>36</sup> Humberto R. Maturana and Francisco J. Varela, *Autopoiesis and Cognition: The Realization of the Living*, Boston Studies in the Philosophy of Science, v. 42 (Dordrecht, Holland ; Boston: D. Reidel Pub. Co, 1980).

<sup>37</sup> John Dupré and John O’Neill, “Against Reductionist Explanations of Human Behaviour,” *Proceedings of the Aristotelian Society, Supplementary Volumes* 72 (1998): 153–88.

In [3.6 – 14.0 Hz](#) a frequency-dependent video magnification algorithmic process that applies spatial decomposition followed by temporal filtering renders the invisible visible, exposing the incessant vibrationality of all matter, this time in a body quantified and turned into a signal, a technical object that becomes a circuit of information. A short video essay, the most ‘literal’ in the series, *3.6 – 14.9 Hz* explores the role technology plays in perception— how it can enhance and amplify, reframe and reveal, and the responsibility inherent in every technological act. The video of a breathing body is processed using Eulerian Video Magnification, a technology developed at MIT in 2013 that ‘takes a standard video sequence as input, and applies spatial decomposition, followed by temporal filtering to the frames.



Figure 11: Video still, *3.6-14.0 Hz* (2019), digital video, 1 minute, 44 seconds

The resulting signal is then amplified to reveal hidden information.<sup>38</sup> The edited video intersperses sequences of the body as originally captured and as processed in frequencies ranging from 3.6 to 14.9 Hz, with video and audio from a Roland Barthes TV interview where he states that ‘*Un objet, si vous voulez, c’est toujours quelque chose de responsable, c’est plus qu’un objet, c’est responsable de ce que les hommes mettent en lui.*’<sup>39</sup>

<sup>38</sup> Neal Wadhwa et al., “Eulerian Video Magnification and Analysis,” *Commun. ACM* 60, no. 1 (December 20, 2016): 87–95, <https://doi.org/10.1145/3015573>.

<sup>39</sup> “An object, if you will, is always something responsible, it is more than an object, it is responsible for what men put in it.” Roland Barthes interviewed by Pierre Desgraupes in the TV program “Lectures Pour Tous” on the



The object here is both embodied presence and algorithmic processing; breathing, the responsibility of being alive, inventing and using new tools and the kind of signals they transmit. In a still from yet another TV interview, this time with Gilbert Simondon, Simondon states: ‘technical objects need, usually, to have circuits of information’ – where information is meant as the circulation and positive stabilization of energy.<sup>40</sup>

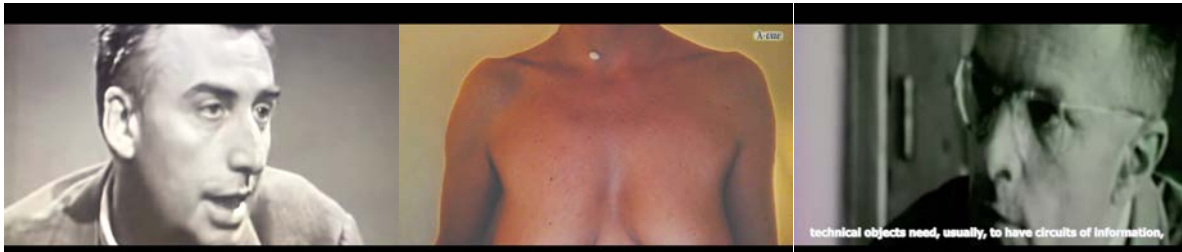


Figure 12: Video stills, 3.6-14.0 Hz (2019): Roland Barthes, *Algorithmically Processed Breathing Object*, Gilbert Simondon)

The body here is situated as a technical object whose signals are processed and amplified to reveal the incessant vibrationality of all matter and the information it emits as it is aiming to stabilize its energy. Such an approach is supported by scientific research on how cells are capable of ‘vibrating in a dynamic manner with complex harmonics’ through a ‘tensegrity tissue matrix system’ bringing tensegrity, epigenetics and neuroplasticity as additional co-ordinates into the polymorphic framework that the *Unruliness of Matter* seeks to establish.<sup>41</sup> The fact that ‘the entire living matrix is simultaneously a mechanical, vibrational or oscillatory, energetic, electronic, and informational network’ points to a matrix that recognizes no boundaries and instead relies on a collectivity and cooperation between all matter, bringing back the Lucretian ethics referenced earlier in this chapter.<sup>42</sup>

Together, these videos sketches develop the basis for an interdisciplinary approach to research that combines insights from philosophy, biology, material engineering, neuroscience, art, and autobiography, and blurs the boundaries between domains and practices, much like the boundaries between different forms of being are blurred themselves and their emergent relationships best understood as ontologically performative and sensual.

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occasion of the publication of his *Essais Critiques*, 25.03.1964, Office national de radiodiffusion télévision française, <https://www.ina.fr/ina-eclair-actu/video/i05265306/roland-barthes-sur-son-livre-essais-critiques>.

<sup>40</sup> Entretien sur la mécanologie, Gilbert Simondon in conversation with Jean Le Moyne, produced by L’Office du Film du Québec, 1968, <https://www.youtube.com/watch?v=VLkjI8U5PoQ>.

<sup>41</sup> Pienta and Coffey, “Cellular Harmonic Information Transfer through a Tissue Tensegrity-Matrix System.”

<sup>42</sup> Oschman, *Energy Medicine*, 49.

This sensual performativity is put forward by observing a material world in constant becoming and as a type of futurology that seeks to challenge a technological legacy that insists on the quantified, the binary, the interpretable and decipherable. The sensual and coordinated dance of flies, a vibrating body, ants that perform in a metonymic frame, a clothed body that jumps into an affective abyss, these are all examples of an encounter with the affective materiality of a world that is formed *because* of these very encounters. The sensory and the sensual that these material encounters hold produce ‘variable intensive affects’ that unlock forces as they come into contact with each other as Bennett reminds us, and one that anyone that is intimately entangled with matter and its capriciousness and manifold is familiar with, as Bennett extends: ‘artisans (and mechanics, cooks, builders, cleaners, and anyone else intimate with things).’<sup>43</sup>

The videos that make up *Jumping in the Affective Abyss* foreshadow an entrainment between algorithmic cultures, memory and the sensuality of matter and advocate for sociotechnical systems and machinic logics that account and are informed by Lyotard’s call for an ‘opening towards other dimensions of sensibility and experience.’ Such openness/opening seems to have led his curation of the seminal exhibition *Les Immatériaux* in 1985, already exploring the tension, but also existential and *material* potentialities between the immaterial and material.<sup>44</sup> This tension between the material and the immaterial, between what algorithms ‘see’ and ‘how they understand the world’ and what humans affectively and epigenetically experience, notions of authenticity, presence and engagement, bias, transparency, accountability, fluidity and non-binarity are no longer theoretical constructs but physical encounters that manifest the synaesthetic materiality of ideas.

As such, the videos in *Jumping into the Affective Abyss*, begin to draw the first of three interpolating grids that imagine a topological surface where affect and the encounter become primary and include kinetic energy, intensity, vibration and resonance. The affective grid drawn-up in this chapter serves both as a foundation for understanding and exploring the complex relationships between humans, technology, and the environment they construct in ways that challenge traditional, reductive approaches, but more importantly seeks to inform and imbue elasticity, unpredictability, multidimensionality and a poetic imaginary to algorithmic grids and approaches to machine learning.

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<sup>43</sup> Jane Bennett, *Vibrant Matter: A Political Ecology of Things* (Durham: Duke University Press, 2010), 56.

<sup>44</sup> Yuk Hui and Andreas Broeckmann, eds., *30 Years after Les Immatériaux: Art, Science and Theory* (Lüneburg: meson press, 2015), 252.

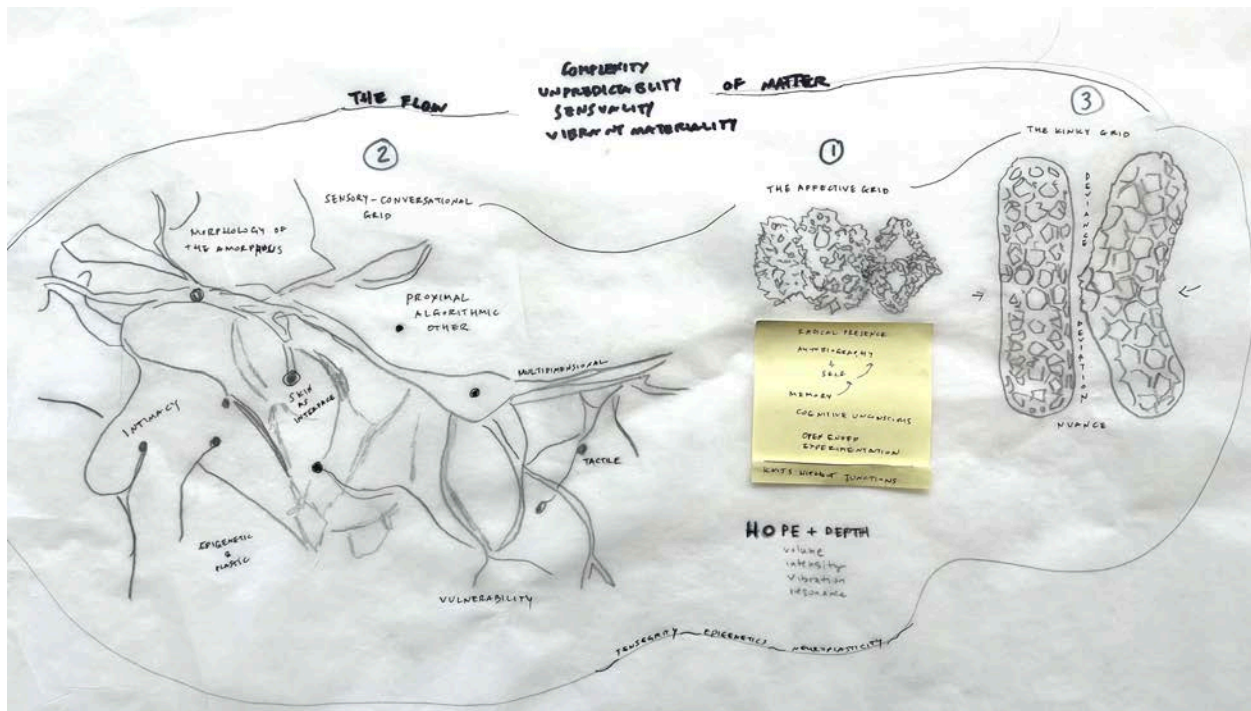


Figure 13: *Network of Thought* diagram (2025)

The following two chapters employ this network of thought to further engage with material configurations that are approached as portals that produce different kinds of surfaces, ones that create a porous membrane and atmosphere where pattern moves from repetition to unruliness. This porous membrane seeks to stretch to a distributed, topological surface structure where human-machine assemblages can be rethought and reconfigured, placing emphasis on vulnerability, depth, affect and where interfaces and tools form a transmodal epidermis.

## Chapter 2: The Encounter & The Grid: The Grid Beyond the Grid



Figure 14: *Vambrace Conversations* (2021)

*The Encounter & The Grid* rethinks the algorithmic grid by approaching weaving as both a practice and a method of thinking. It elaborates on the making of two wearable artifacts, *Transitional Object I & II*, that together act as probes and inhabited meditations and mediations on an embodied and sensory relationship with algorithmic logics weaving together a sensory and conversational grid. *Transitional Object II*, the first work that is described later in this chapter, is a glove woven with performance yarns and embedded with a micro-controller that aims to introduce a conversational architecture in a weave between human gestuality and machinic interpretation.

It partly follows Anni Albers' work where weaving is approached as a medium that carries a complex array of material and immaterial codes. Albers' interest and engagement with traditional weaving practices and her insistence in innovating on those practices, and in fact in any emergent material re-configuration, is adopted as way to evade the functionalisation of



meaning in closed machine learning models. Her critical approach to making acknowledges the instability of objects while reclaiming the accumulated knowledge that materials display and has served as a key inspiration in developing the pair of close-fitted gloves that make up *Transitional Object II: Vambrace Conversations*. Albers sees this accumulated knowledge and instability as partly forsaken in the industrialised production of woven fabrics, where speed and standardisation eschews variability and the expressive potentiality of the encounter between the material and its affective environment, altering dimensions of duration and temporality, the accumulated past and the accelerated future, something that now applies to all domains of production, be they material or knowledge based.<sup>1</sup>

Weaving, computation and algorithmic thinking are historically intertwined. The fixed grid of the warp and weft represents a binary code and the ability to generate multiple patterns, setting up a fundamental relationship between grid and pattern that is both epistemic and ontological: rhythm, structure, regularity, modularity, proportionality, variation, and scalability all emerge from the harness of the loom.

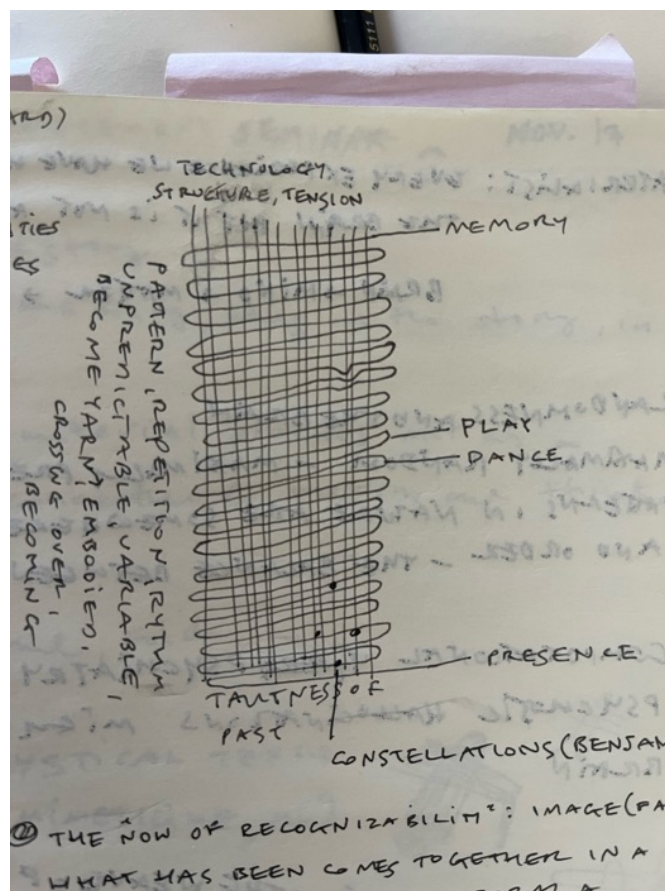


Figure 15: *Constellations* (2020)

<sup>1</sup> Anni Albers et al., *On Weaving*, New expanded edition (Princeton and Oxford: Princeton University Press, 2017).

Machine learning descends from this ancient grid that contains ‘abstractions and rituals’ that marks bodies and territories.<sup>2</sup> It takes stock of transactions, assumed or translated as intentions, codified into generic taxonomies that follow the grid but without the lag, rhythm, material memory and tactility that the loom’s grid makes possible.

As weaving also represents a ‘cosmological performance, knotting proper relationality and connectedness into the warp and weft of the fabric’ as Haraway notes, then it bears to ask what is the cosmology that the grid of machine learning connects to and what kind of lived connections it sustains.<sup>3</sup> Haraway’s call for ‘making trouble,’ and for ‘tentacular thinking’ is taken up literally and applied on the frame of the loom, bringing in new material engagements and materialities that introduce notions of softness, elasticity, and open experimentation, bringing the tactility of weaving to algorithmic logics.

Following Krauss seminal work on the *Grid*, the grid of the loom is approached as a structure that contains both materialism, mythic powers, poetry, individual narratives and logics and expanded upon to account for new ways of looking at patterns, woven and algorithmic and the materiality of the immaterial.<sup>4</sup> This same grid is also rethought inspired by Yuk Hui’s move away from ‘mono-technology’ and towards a ‘techno-diversity’ which ‘embed[s] different relations with nonhumans and the larger cosmos,’ and is also used as means of providing a direction that circumvents technological dystopia and invites poetry, plurality and hybridity.<sup>5</sup>

The material investigations in this chapter follow what Samuel calls ‘the materiality of thinking,’ and are explored following Mandelbrot’s ‘morphology of the amorphous,’ establishing a new way forward that proposes an expanded, malleable, and dynamic understanding of the grid and its relationship to patterning.<sup>6</sup>

This understanding of the grid in turn allows for a double move on the notion of the encounter to emerge: an encounter between technological artifacts, embodied and inhabited, articulating a space where concepts get materialized and abstract thought is acquiring form, texture, surface and sensuality, as well as encounters between siloed practices and methodologies; thinking, as Deleuze reminds us, is always ‘experiencing, experimenting’ and

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<sup>2</sup> “Three Thousand Years of Algorithmic Rituals: The Emergence of AI from the Computation of Space - Journal #101,” accessed June 30, 2024, <https://www.e-flux.com/journal/101/273221/three-thousand-years-of-algorithmic-rituals-the-emergence-of-ai-from-the-computation-of-space/>.

<sup>3</sup> Haraway, *Staying with the Trouble*, 91.

<sup>4</sup> Rosalind Krauss, “Grids,” *October* 9 (1979): 51–64, <https://doi.org/10.2307/778321>.

<sup>5</sup> Yuk Hui, “One Hundred Years of Crisis Journal #108 April 2020 - e-flux,” *e-flux*, no. 108 (April 2020), <https://www.e-flux.com/journal/108/326411/one-hundred-years-of-crisis/>.

<sup>6</sup> Nina Samuel, ed., *The Islands of Benoît Mandelbrot: Fractals, Chaos, and the Materiality of Thinking* (New Haven: Bard Graduate Center : Decorative Arts, Design History, Material Culture, 2012).

this experimental, experiential and sensorial aspect of thinking becomes primary in the conversation that emerges between the body and machine learning systems as elaborated in this chapter.<sup>7</sup>

To explore this double-encounter, two pieces of work situated in the field of wearable technology are described in detail as they reveal tensions inherent in the development of hybrid materialities: the merging of practices that operate under different knowledge regimes, and an engagement with embodiment as means to introduce a new model of thinking in the relationship of material encounters with artificial intelligences. The two pieces are part of the series *Transitional Objects*, where transitionality refers to the not-yet actualized, a space of experimentation where relationships between object-subject and environment are rethought, and where these objects act as probes for the actualization of alternate futures, foregrounding the encounter as both a theoretical and manifest affective experience.

The term *Transitional Object* is borrowed from Winnicott, but while Winnicott's transitional objects participate in the child's passage to a realization of the self as an individuated entity, here they refer to the objects developed in the practice that act as probes and props that foreground a new relationship to technological artifacts and artificial intelligences.<sup>8</sup> As such, they are posited as inhabitations that help situate the nature of technological objects, how they participate in the formulation of the me-not-me human-machine assemblages, how they invite the ability to imagine alternate technological objects, and finally, to explore the edges and implications of experiencing affective type of relationships through and with artificial intelligences. The term transitional, is meant to indicate the ambivalent, and as-yet immature relationship to technological artifacts, and one that has not settled fundamental questions around the ontological and performative uses of technologies that are situated on the body, and certainly not the cosmological ones that both Albers and Haraway identify in weaving practices.

In the introduction to *Transitional Subjects: Critical Theory and Object Relations, New Directions in Critical Theory*, Allen and O'Connor write:

The qualities that we ideally associate with human interactions, where unexpected and enriching new features of the world can be revealed, are

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<sup>7</sup> Gilles Deleuze, *Negotiations, 1972-1990*, trans. Martin Joughin, European Perspectives (New York: Columbia University Press, 1995), 106.

<sup>8</sup> D.W. Winnicott, "Transitional objects and transitional phenomena; a study of the first not-me possession," *The International Journal of Psychoanalysis*, 89-97 (1953).

replaced by measurable, calculable, predictable quantitative measurements.<sup>9</sup>

The two projects described here, *Transitional Object I and II*, aim precisely to reveal such ‘enriching new features of the world’ and resist the tyranny of the ‘measurable, calculable, predictable quantitative measurements’ of machine learning. This practice-led research opts to adopt an open and fluid framing and space where ‘[w]earable technologies at the ready, a new enlightenment is in order. We are now at the moment to do just that. In a certain sense one could say: In the face of adversity, there is nothing wrong with hope.’<sup>10</sup> Expanding on Golding’s call, this chapter employs the term wearable environments instead of wearable technologies, as it better captures the material affectivity of clothing as it reconfigures relationships to self, the proximate other and the communal they. The term also better addresses the affective relationship that is created between skin as interface, the interaction between human and sensor-based modalities and the energy that is shared between the two. Ideally, the term environment would be replaced with that of atmosphere, but for various reasons addressed later in this chapter as well as alluded in terms of the immaturity that these technologies exhibit, they are at best part of an environment and do not have the flexibility, immersive and dynamic energy that atmosphere evokes.

These wearable environments and their implications for the repositioning of technology, the double encounter and the rethinking of the grid is explored through hybrid materialities and the transitionality of these objects. These are developed both as theoretical constructs and as material, embodied incarnations of the problematics of agency, presence, awareness and sentience, where the reassembly of the material world is presented as a foundation for action that participates in a cognitive and sensory articulation and resonance in the circulation of meaning.<sup>11</sup>

In the process, they explore how such encounters can introduce intimacy, vulnerability, care and responsibility, and a new understanding of connections and connectivity, on and off the grid of the loom, both material, theoretical and affective in the relationship to technological objects. Importantly, this is approached as affective states that refer to sensory responses to technology, and not as those understood to be taking place in the machine itself. This is a

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<sup>9</sup> Amy Allen and Brian O’Connor, eds., *Transitional Subjects: Critical Theory and Object Relations*, New Directions in Critical Theory (New York: Columbia University Press, 2019), 2.

<sup>10</sup> Golding, “The Courage to Matter,” 486.

<sup>11</sup> Tara McPherson, *Feminist in a Software Lab: Difference + Design*, MetaLABprojects (Cambridge, Massachusetts ; London, England: Harvard University Press, 2018).



critical distinction, as it departs from calls to have the machine itself be the one which ‘experiences’ such affective states.<sup>12</sup> Equally importantly, this approach insists on using material practices, expounding on the inherent challenges in the making of new materialities and the capricious response of material properties to changing environments, and the manufacturing and supply chain integration challenges that have significantly hindered the development of market ready wearable environments that could meaningfully transform sensory experiences.<sup>13</sup> This capriciousness and energy of matter is in fact what many AI researchers, most notably Yann LeCun and his work on latent variable energy-based models, propose is missing in advanced AI systems, emphasising that ‘[H]umans and animals have a good dynamical model of their own bodies but also of physics and social interactions,’ none of which AI systems can make a claim to today.<sup>14</sup>

The process of experimenting with new material assemblages combined with machine learning models is what informs a theoretical model, as opposed to starting with a model that seeks to be applied in the practice. This approach takes on what Zowie Broach, head of fashion at the Royal College of Art, calls ‘experiment without knowing’ and the ‘awkward fragile thinking that might be sharp or reflective of who we are and how we can become.’<sup>15</sup> This ‘experiment without knowing’ is leading the practice, opening it up to the unknown and an enmeshing with form, surface and the plurality of matter as it is braided into new configurations. It also forms a departure from the work of Barad, Hayles and Braidotti and new materialist schemas, where a model of science is applied to making practices and where ‘the most effective strategies developed by contemporary humanities scholars is to actually theorize via and with science.’<sup>16</sup>

Instead, the complexities of matter and its participation in an emerging sociotechnical ontology are revealed as new affective and embodied encounters, both through the process of making and as experienced on the body. This embodiment and the difficulties of bringing new materialities to being, also underscores a criticism of speculative design as a strategy for imagining future scenarios and exposing their ethical ramifications. Without engendering sensory inhabitations which in the process push the edges of engineering and manufacturing

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<sup>12</sup> Kingson Man and Antonio Damasio, “Homeostasis and Soft Robotics in the Design of Feeling Machines,” *Nature Machine Intelligence* 1, no. 10 (October 2019): 446–52.

<sup>13</sup> João J. Ferreira et al., “Wearable Technology and Consumer Interaction: A Systematic Review and Research Agenda,” *Computers in Human Behavior* 118 (May 2021): 106710, <https://doi.org/10.1016/j.chb.2021.106710>.

<sup>14</sup> Anna Dawid and Yann LeCun, “Introduction to Latent Variable Energy-Based Models: A Path Towards Autonomous Machine Intelligence” (arXiv, June 4, 2023), 5, <https://doi.org/10.48550/arXiv.2306.02572>.

<sup>15</sup> Zowie Broach, *Zowie Broach: Explore the Unknown and Design for the Future*, Fashion Insiders, 2019, video, 2:23 min., [www.youtube.com/watch?v=AEHbYLw39UI](https://www.youtube.com/watch?v=AEHbYLw39UI), accessed October 18, 2022.

<sup>16</sup> Rosi Braidotti, *The Posthuman* (Cambridge, UK ; Malden, MA, USA: Polity Press, 2013), 158.

infrastructures, the future remains speculative as opposed to actualised—it is in the made that the possible can emerge and its implications fully explored.

While the work of Anthony Dunne and Fiona Raby, pioneers in the field of critical and speculative design, indeed stimulates discussion and debate amongst a diverse set of stakeholders, raises questions about the sociotechnical implications of emerging technologies and provides ‘imaginative horizons and provides new perspectives,’ it fails to expand the materiality of thinking to embodied and infrastructural domains.<sup>17</sup>

*The Unruliness of Matter* in its practice insists that it is only in actually producing artifacts that can be viscerally experienced, and in addressing all the material, engineering, the complex web of collaborators involved, and design challenges that the making of the new entails, that new models of action can be effectively and affectively explored, and the future actualised instead of deferred.

The two projects described here are situated on the body and are part of what is generally referred to as ‘wearable technologies.’ *The Posthuman Dictionary* describes wearables as ‘textile or clothing [that] turns them into smart garments that have a certain agency of their own,’ a claim that introduces multiple problematics and demands qualification, both of which the practice aims to address.<sup>18</sup> The ambiguity of the term ‘wearable technology,’ used to describe garments that incorporate conductive materials, sensors, actuators, microcontrollers and power sources already betrays the inherent difficulties of the field. Initially called ‘wearable computing,’ later ‘fashionable technology,’ and recently ‘smart fabrics or garments,’ or ‘e-textiles,’ this shifting terminology demonstrates the unsettled place these artefacts hold in the practices of both fashion and engineering, and the uneasy integration of divergent knowledge systems.<sup>19</sup> Susan Ryan, in *Garments of Paradise* notes that the paucity of critical literature on wearable technologies is a reflection of a confusion about its very nature, as it is claimed by competing industry groups and practices, with no meaningful discourse and integration emerging between them.<sup>20</sup>

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<sup>17</sup> Anthony Dunne and Fiona Raby, *Speculative Everything: Design, Fiction, and Social Dreaming* (Cambridge, Massachusetts ; London: The MIT Press, 2013), 92.

<sup>18</sup> Rosi Braidotti and Maria Hlavajova, eds., *Posthuman Glossary, Theory* (London Oxford New York New Delhi Sydney: Bloomsbury Academic, 2018), 455.

<sup>19</sup> The term “smart fabrics” to describe technological innovations in fabrics is particularly misplaced, as natural fibers like wool, linen and silk exhibit versatile and highly responsive relationships to their environment.

<sup>20</sup> Susan Elizabeth Ryan, *Garments of Paradise: Wearable Discourse in the Digital Age* (Cambridge, Massachusetts: The MIT Press, 2014), 6.

In response, this space reformulated as described above as a wearable *environment*, explores the implications of such repositioning through hybrid materialities and *Transitional Objects*.<sup>21</sup> The wearable aspects of these projects, as folding, sensory, sculptural and haptic surfaces that make contact with the body, propose an alternative to the dominance of vision in both culture and in the prevalence of machine vision as means of codifying motion and affect.<sup>22</sup> By introducing haptics, including thermal feedback, the work engages with touch as a modality, that as Irigaray notes, ‘takes part in all our sensory perceptions, all our living relationships, but our culture is dominated by looking at. Furthermore, this looking at aims at seizing, more than at contemplating.’<sup>23</sup> Elaborating on the surface of touch is a way to move away from models of ‘recognition’ and allow for a ‘range of affective tones’ to participate in encounters with technological artifacts and other intelligences—with the primary characteristic of the encounter being that ‘it can only be sensed. In this sense it is opposed to recognition.’<sup>24</sup>

This opposition to recognition and an invitation to introduce a ‘range of affective tones’ in encounters with technology is what drove the development of the collaborative wearable environments described here: starting in reverse order with *Transitional Object II: Vambrace Conversations*, funded by a UK EPSRC Network Human Data Interaction (HDI) grant and then followed by a prior work, *Transitional Object I: An Alive Like Style Free Companion*, funded by WearSustain, part of EU’s *Horizon 2020 program*.<sup>25</sup>

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<sup>21</sup> McPherson, *Feminist in a Software Lab*.

<sup>22</sup> Rosalind W. Picard, *Affective Computing*, First paperback edition (Cambridge, Massachusetts London: The MIT Press, 2000).

<sup>23</sup> Luce Irigaray, “Perhaps Cultivating Touch Can Still Save Us,” *SubStance* 40, no. 3 (2011): 137.

<sup>24</sup> Gilles Deleuze, *Difference and Repetition*, trans. Paul Patton (London: Continuum, 2004), 139.

<sup>25</sup> [hdi-network.org/music-ai-created-content-and-industrial-cultural-effects/](https://hdi-network.org/music-ai-created-content-and-industrial-cultural-effects/) & <https://cordis.europa.eu/project/id/732098/reporting>

## Transitional Object II: *Vambrace Conversations*



Figure 16: *Vambrace Conversations* (2021)

A pair of sleeves is constructed using a woven fabric made of conventional yarns (wool and cotton), reflective, cut-resistant, and a variety of conductive yarns, also commonly referred to as functional yarns. The conductive yarns are used to generate heat in different parts of the sleeve, based on the weave's pattern, as well as to connect to custom-electronics that include a microcontroller, in this case an Arduino Nano 33 BLE that runs a machine learning model, and a

custom designed power management board.<sup>26</sup> The machine learning model is trained to recognize a number of gestures, in response to which different sections of the conductive yarns in the woven fabric are programmed to produce a cadence of heat, ranging from a murmur to a burning, almost aggressive sensation on the skin, where the mathematics of the weave relate to the skin as pixels, creating a new kind of grid that brings human sensuality and sensoriality and machinic responsiveness in conversation with each other, establishing a sensory and conversational grid.

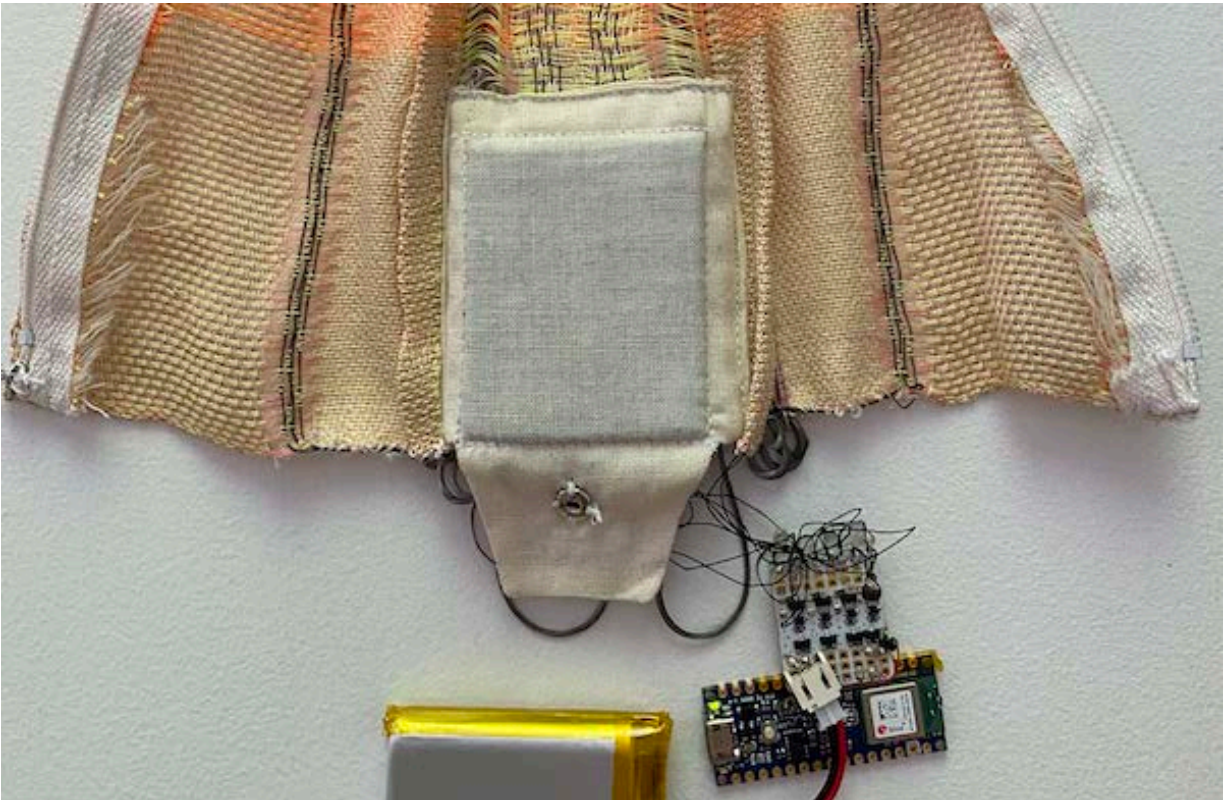


Figure 17: *Vambrace Conversations* (2021), conductive yarns connected to a heat management board and an Arduino Nano 33 BLE

The piece probes the possibility of developing a language between human gestuality and a responsive surface that seeks to translate human motion to a nuanced multimodal sensory affect. As the heat patterns generated by the conductive yarns change as the machine learning model evolves, the relationship between training and performing for the machine is explored as a potentially open and evolving system of communication between human motion

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<sup>26</sup> We used an Arduino nano 33 BLE as an affordable and advanced platform that incorporates a low power Bluetooth communication module, a gyroscope that measures orientation and angular velocity, and an accelerometer that measures the acceleration of a body in its own instantaneous rest frame, together allowing for the measurement of kinetic motion. This microcontroller also runs Tensor Flow, a free and open-source software library for machine learning, so we could understand the technological limitations and affordances available to an experimenting community of art and design practitioners.

and machine intelligence. Here the stochastic nature of the motion of being is introduced as an important consideration in approaches to the development of machine learning models. Part of the intention of the piece is to build an alternative epistemological framework for the enframing of relationships to technology, diversify the uses of technology and point to new ways of coexistence that ‘embed[s] different relations with nonhumans and the larger cosmos.’<sup>27</sup>

The sleeve’s fabric is woven on a semi-automatic Arm Selectron-Patronie loom with an electronic interface, 24 harnesses and 2 warp beams operated by master weaver Stefanie Seitingner without a predetermined design. Instead the pattern is improvised during the weaving session in a collaborative process, following the logic and resonant dimensionality and texture of the various yarns. The woven surface originates in a space that already merges programming and the body’s rhythmical movement as it weaves the fabric. In this relationship of collaboration and motion, the body moves to weave, the machine raises and lowers the harnesses, responding to the programmed commands, a circularity and repetition that evokes the framing of space in Bruce Nauman’s *Walking in an Exaggerated Manner Around the Perimeter of a Square* (1967-68). In this video loop the artist walks around a square delineated on his studio floor with meticulous articulation, emerging and reemerging from the camera and creating a multidimensional grid where his body and the space of his studio blend with each other.<sup>28</sup>

*Transitional Object II: Vambrace Conversations*, starts with weaving as a practice that brings together the algorithmic textuality of the woven grid and the plurality of language, recalling Barthes when he writes that ‘[T]he plural of the Text depends, that is, not on the ambiguity of its contents but on what might be called the *stereographic plurality* of its weave of signifiers (etymologically, the text is a tissue, a woven fabric).’<sup>29</sup>

This plurality of signifiers is explored by building a wearable artifact, in this case a sleeve, that experiments with the development of a language of sorts between skin as pixels, and a surface that responds to gestures, and precisely looks to evoke a stereographic plurality. The stereographic plurality refers here to the bringing together of gesture, algorithmic code, weaving as code and the skin as the recipient of these layered meanings that is asked to decipher and engage in a type of conversation with an evolving machine learning model.

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<sup>27</sup> Yuk Hui, “One Hundred Years of Crisis Journal #108 April 2020 - e-flux,” *e-flux*, no. 108 (April 2020), [www.e-flux.com/journal/108/326411/one-hundred-years-of-crisis/](http://www.e-flux.com/journal/108/326411/one-hundred-years-of-crisis/).

<sup>28</sup> Bruce Nauman, *Walking in an Exaggerated Manner Around the Perimeter of a Square*, 1967-68, 16mm film transferred to video (black and white, silent), 10 min.

<sup>29</sup> Roland Barthes, *Image, Music, Text*, trans. Stephen Heath (London: Fontana Press, 1987), 159.





Figure 18: Weaving the fabric in a collaborative improvisational process with master weaver Stefanie Seitinger

*Transitional Object II* is also paying homage to Anni Albers's attention to 'the epidermis of cloth' and her constant rethinking of what textiles can do, along with her view of weaving as a process through which ideas unfold. Anni Albers pioneered the use of technical materials in weaving, most notably with her design of a soundproofing fabric using cellophane with cotton chenille as a wall-covering material for the Bundesschule Auditorium in Bernau, Germany in 1929, creating a multi-sensory fabric that in acting as environment engages all the senses, so 'even the effect of light through the fabric is registered or experienced haptically.'<sup>30</sup>

This approach to weaving, as a technique that connects materials, processes, and patterns of thought into a texture and surface, is then expanded by introducing metalized conductive yarns and embedding by hand electronic sensors into the woven surface, bringing craft and the binary logic of the loom together. The use of a woven surface is also a way to introduce the Lucretian fold and corporeal flows into a discourse with algorithmic logics. The stochastic and morphogenetic properties of the Lucretian corporeal flows, where the senses and

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<sup>30</sup> T'ai Lin Smith, *Bauhaus Weaving Theory: From Feminine Craft to Mode of Design* (Minneapolis ; London: University of Minnesota Press, 2014), 102.

the flow of matter become one and the same become part of ‘kinotopological modulations, waves, or morphisms of the flow.’ These ‘kinotopological modulations and waves’ are made literal in the unsettled relationship that is proposed between the woven fabric and skin as pixels, as the fabric heats up in response to human motion.<sup>31</sup>

In *Transitional Object II: Vambrace Conversations* the relationship of gesture, motion, and machinic response, seeks to go beyond a relationship of response to commands and instead experiment with a different kind of embodied relationship between machine and human. The work looks at the way human gestures form themselves an ambivalent language, one that evades machinic intelligences, while at the same time asks how this ambivalence can become part of the language of algorithmic systems.

The responsive yarns, the sculptural form of the object and the ambivalence of the interaction between motion and machinic response recall the Lucretian corpora. Instead of a static determinacy of things ‘stochastic flows that move’ locate the qualities of matter in sensation and not as fixed entities, and here experiment with the indeterminate relationship built in the machine learning feedback loop.<sup>32</sup> In this pairing between gesture recognition and a machine learning model, gesture is initially turned into a representation (define), captured (train) and performed (execute) –already pointing to the reformulation of language from one of human performativity to a machinic one (define, train, execute). Here, the machine learning model starts with the ontological ‘what is’ in the define phase, moves to the epistemological ‘this is’ in the capturing of each movement, into an onto-epistemological ‘this is it,’ and finally to a performative ontology of ‘is’ in the execute, blurring the boundaries between human and machinic performativity, thus repositioning the onto-epistemological terrain of both human and machine.

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<sup>31</sup> Thomas Nail, *Lucretius I: An Ontology of Motion* (Edinburgh: Edinburgh University Press, 2018), 127-28.

<sup>32</sup> Nail, 145.



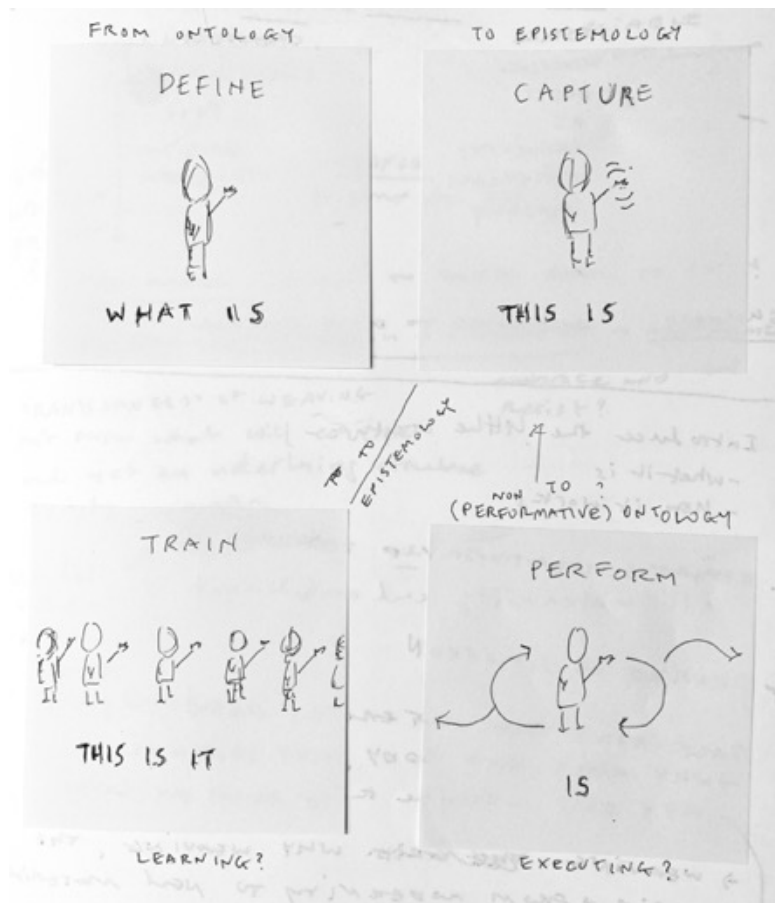


Figure 19: *A Philosopher Talks to the Machine*: “Philosophers often behave like children who scribble some marks on a piece of paper at random and then ask the grown-up. “What’s that?” – It happened like this: the grown-up had drawn pictures for the child several times and said: “this is a man”, “this is a house”, etc. And then the child makes some mark too and ask: what’s this then?”<sup>33</sup> ink on paper (2020)

One of the key questions *Vambrace Conversations* tackles is the possibility of a move away from a primarily representational and responsive binary machine learning model. Instead of just mapping different gestures to heat generation patterns in a 1-to-1 relationship, the piece attempts the entertains the possibility of an evolving relationship of modulated signals of information as anticipation. *Vambrace Conversations* in its development explores the relationship between the machinic confidence of predictability and calculability and the edges and make-up of anticipation. Humans anticipate, algorithms predict.<sup>34</sup> This dimension of anticipation, where tacit knowledge, embodiment, flippancy, nuance, uncertainty, and unpredictability are key components, the mapping of skin to material surface, of gesture to heat

<sup>33</sup> Ludwig Wittgenstein, *Culture and Value*, ed. Georg Henrik von Wright, trans. Peter Winch, (Chicago: Chicago Univ. Press, 1980), 17e.

<sup>34</sup> “When I came home I expected a surprise and there was no surprise for me, so, of course, I was surprised.” Wittgenstein, 44.

coordinates, of anticipation to tactility, these all expand the notion of the grid and how patterns are mapped ontically onto one.

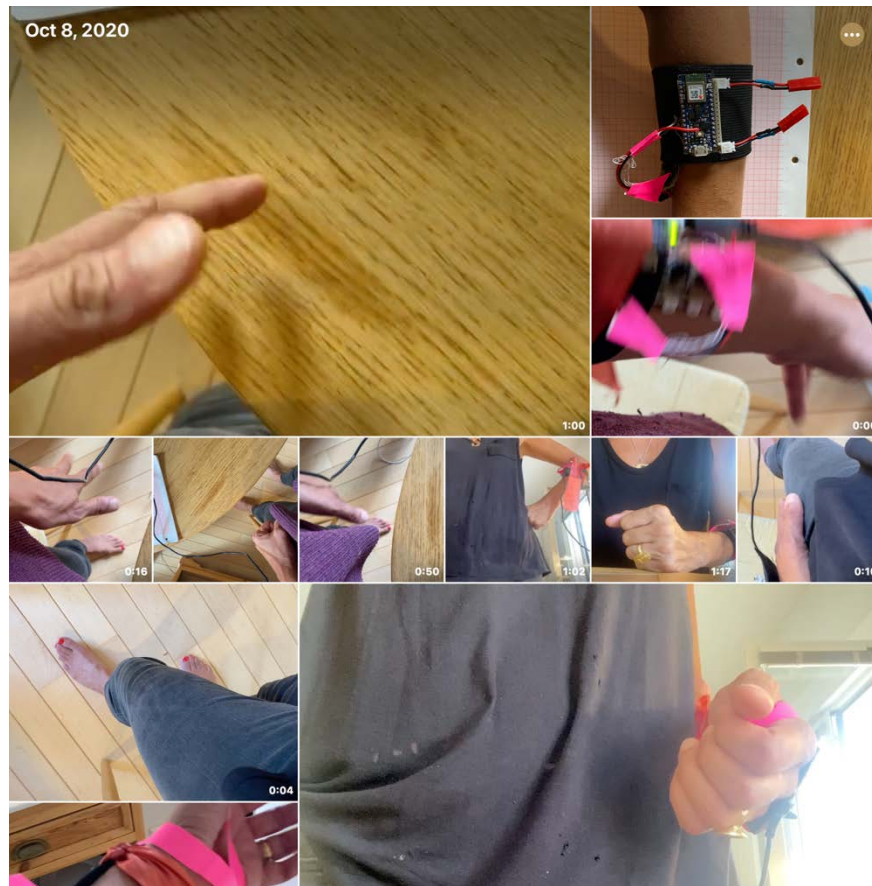


Figure 20: Attempting to capture 'gestures' on video while looking at their graph with an early prototype

Initially different movements were performed and captured in video to understand which ones had clear resolution and definition and could be understood as gesture by the model, as well as communicate the type of movements performed to Ling Tan, the remote collaborator who was building the machine learning model. Looking at the videos and the graph produced by the raw data proved of little help, and the movements that had the cleanest definition were the most brusque and sharp.

Based on this library of brusque movements that the model could best decipher, the work investigates the possibility of creating a relationship of sorts and a basis for communication between human gestuality and algorithmic interpretation. It examines what kind of machine learning training would be needed for an affective and intra-active relationship to emerge, where predictability is reconstituted as a form of anticipation for both human and machine. The work seeks to go beyond the call-and-response relationship, so endemic to machine learning

systems, and the pushes and pulls of general knowledge acquisition, escape recursivity, and instead experiment with a form of exchangeability that is ‘simultaneously bolstering or even foregrounding curiosity.’<sup>35</sup>

The fundamental question that the project then asks: is the idea of a non-functionalistic, non-goal-oriented machine-language model and its relationship to human subjectivity inherently paradoxical, and if so, what does this paradox enable?<sup>36</sup>

Here, the piece *Vambrace Conversations* seeks to transduce the vocabulary used to describe human-data interactions, and in fact probe on how such a vocabulary can be developed so as not to privilege a human or machinic grammar, and to imagine a languaging between the two, one that can provide a more ‘precise vocabulary’ to discuss relationships between human and artificial intelligences, as Bratton and Agüera y Arcas urge.<sup>37</sup>

The process of training the model begins firstly with performing different human gestures, and observing how they are tracked through a combination of accelerometer and gyroscopic data so that they can be delineated for a machine learning model to recognize them as *gesture*. As gestures are performed a graph displays their coordinates, gestures become movement –it is too early for them to be *classified* as gesture. Edges, spaces, and pauses start appearing, and in this motion with edges, spaces, and pauses, *gesture mimics gesture*, not a mirroring, but a look-out for coordination, a curiosity about the *resonance* of gesture, where meaning is conveyed outside language.

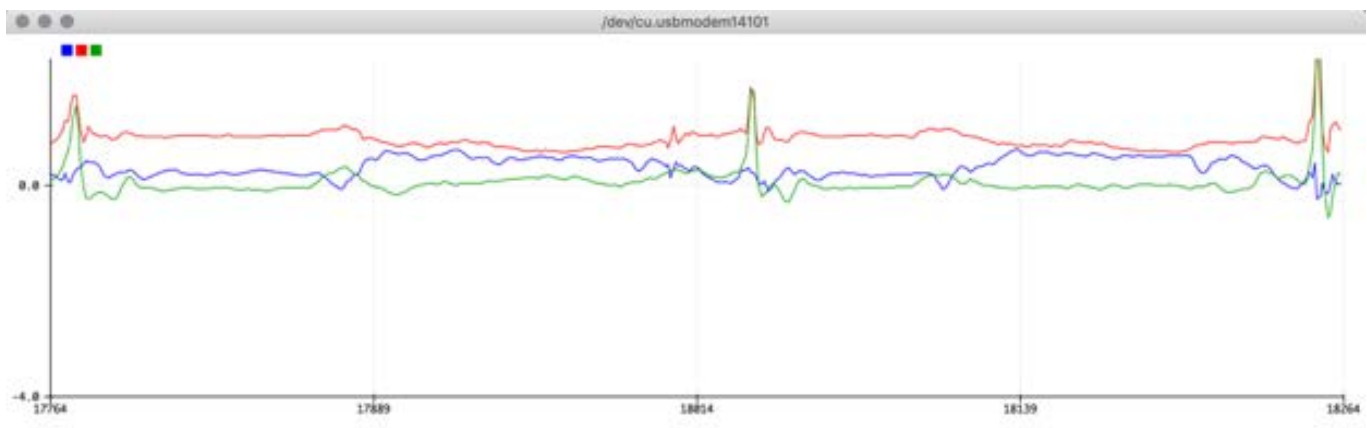


Figure 21: Arduino generated graph of gyroscopic and accelerometer data representing motion

<sup>35</sup> Martin Reinhart, “Know Your Name: A Short History of Occidental Knowledge Systems since the Renaissance,” in *Data Loam: Sometimes Hard, Usually Soft: The Future of Knowledge Systems*, ed. Jonny Golding, Martin Reinhart, and Mattia Paganelli, Edition Angewandte (Berlin: De Gruyter, 2021), 36.

<sup>36</sup> Elena Esposito, “Artificial Communication? The Production of Contingency by Algorithms,” *Zeitschrift Für Soziologie* 46 (January 28, 2017), <https://doi.org/10.1515/zfsocz-2017-1014>.

<sup>37</sup> Benjamin Bratton and Blaise Agüera y Arcas, “The Model Is The Message,” *Noema, Published by the Berggruen Institute*, July 12, 2022, [www.noemamag.com/the-model-is-the-message](http://www.noemamag.com/the-model-is-the-message).

In this set-up legibility is not a property of the system's configuration but a function of the system's very existence and success –the emergence of an intra-active relationship is based on a sensory and fluid relationship between the two actors and on whether a type of stochastic intra-active legibility can emerge. As the woven material touches the skin, programmed to create a language of call and response, intra-actional topographical regions of sensation emerge, ones that seek to add sensory nodal points to the grid and render it multi-dimensional and multiversal.

*Vambrace Conversations* explores ways in which a theoretical framework of intra-activity, respons-ability, relationship with non-human intelligences and applied ethics can be articulated and made present in machine learning systems. The Baradian framework of intra-activity and respons-ability is expanded to indeed take to heart that 'touching, sensing, is what matter does, or rather, what matter is: matter is condensations of response-ability.'<sup>38</sup> This ethical dimension, explored through human gesturality in its relationship to a machine learning model expands on Agamben's notion that gesture is not only 'the exhibition of mediality,' here doubled by the mediality of the machine, but also that which manifests the ethical as the fundamental dimension of human communion.<sup>39</sup>

In response to human gestures, the electronics on the sleeve are engineered and programmed to be able to produce varying sensations of heat, to modulate heat in ways that mimic a caress, an aggressive burning sensation, or as a heat spike that feels like it is cold, playing with skin as interface and exposing how material surfaces can participate in the entangled dance of matter, the complex character of sensory perception, the affective relationship between the senses, imagination and memory; as Spinoza reminds us '[T]he mind can exercise neither imagination nor memory save while the body endures.'<sup>40</sup>

The nexus of the work begins with the performance of gestures that do not take place for the machine to mimic, but so it can elaborate on the datafication of gestural performativity. Each gesture is turned into segmentized spatiotemporal coordinates of motion. Edges become hard and articulated, the perpetual continuity of motion separated by the pauses that start making motion as gesture legible for the machine.

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<sup>38</sup> Karen Barad, "On Touching—the Inhuman That Therefore I Am," *Differences* 23, no. 3 (December 1, 2012): 206–23.

<sup>39</sup> Giorgio Agamben, in *Philosophers on Film from Bergson to Badiou: A Critical Reader*, ed. Christopher Want (New York: Columbia University Press, 2019), 215–16.

<sup>40</sup> Benedictus de Spinoza, *Complete Works*, ed. Michael L. Morgan, trans. Samuel Shirley (Indianapolis, IN: Hackett Publishing Company, Inc, 2002), 373.

In fact, in this first instance of training the model to recognise gestures and establishing a ‘ground truth’ for the model it becomes clear that the pauses between movement are as much parts of what constitutes gesture as the motion itself.<sup>41</sup> Here, the pauses recall the blank spaces between words that Mallarmé inserts around the verses of his enigmatic poem *A Throw of the Dice* to reconfigure their meaning, used as a ‘surrounding silence.’ For Mallarmé it is in these spatial interventions that ‘prismatic subdivisions of the Idea’ emerge.<sup>42</sup> Following one of the typographic readings of the poem and stitching together only the capitalised words, the sentence “*THE NUMBER, IT WOULD BE, CHANCE, NOTHING, WILL HAVE TAKEN PLACE, BUT THE PLACE, EXCEPT, PERHAPS, A CONSTELLATION,*” appears.<sup>43</sup>

Replace Mallarmé’s ‘number’ with the word ‘algorithm’: the data-points the machine model captures now become CHANCE encounters instead of a ground truth. What unfolds then is a location, a PLACE, a movement that is part of the CONSTELLATION of being. This constellation and perpetual unfolding evokes Muñoz’s notion of the gesture as something that refuses ‘a certain kind of finitude.’<sup>44</sup> It also raises epistemological questions around the notion of ground truth used in training AI systems and the resulting simplification of complex and embodied realities that depend on a grid that allows for pre-determined patterns to emerge, or as Florian Jatón writes, ‘we get the algorithms of our ground truths.’<sup>45</sup>

In lieu of a ground truth, constellations and correspondances are explored: already in this first step of discovery of gestural delineation for the machine—of a hand extended up or reaching down, a wrist rotating or a hand counting a beat on a body’s thigh, or the stillness of a body— in this concert of gesturality and computational representation, already two low-

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<sup>41</sup>“Ground truth is an artifact that typically takes the shape of a digital database. Its main function is to relate sets of input-- data— images, text, audio—to sets of output-targets—labeled images, labeled text, labeled audio. As ground truths institute problems that not-- yet-- designed algorithms - will have to solve, they also establish their veracity. As this book indicates, many ground truths do not preexist and thus need to be constructed. The collective processes leading to the design and shaping of ground truths heavily impact the nature of the algorithms they help constitute, evaluate, and compare.” Florian Jatón and Geoffrey C. Bowker, *The Constitution of Algorithms: Ground-Truthing, Programming, Formulating*, Inside Technology (Cambridge, Massachusetts: The MIT Press, 2020), 294.

<sup>42</sup> Stéphane Mallarmé, *Collected Poems*, trans. Henry Weinfield (Berkeley: University of California Press, 1994), 121.

<sup>43</sup> Ibid, 140-144 [italics and capitalisation Mallarmé’s]

<sup>44</sup> José Esteban Muñoz, *Cruising Utopia: The Then and There of Queer Futurity*, 10th Anniversary edition, Sexual Cultures (New York: New York university press, 2019), 65.

<sup>45</sup> Florian Jatón, “We Get the Algorithms of Our Ground Truths: Designing Referential Databases in Digital Image Processing,” *Social Studies of Science* 47, no. 6 (December 2017): 811–40, <https://doi.org/10.1177/0306312717730428>.

resolution and inter-related correspondances begin to occur.<sup>46</sup> The first one is in the relationship between human and machine at the moment when movements are performed, plotted as the x, y, z coordinates of velocity and angularity, for both human and machine alike to observe and assess their viability as gesture.

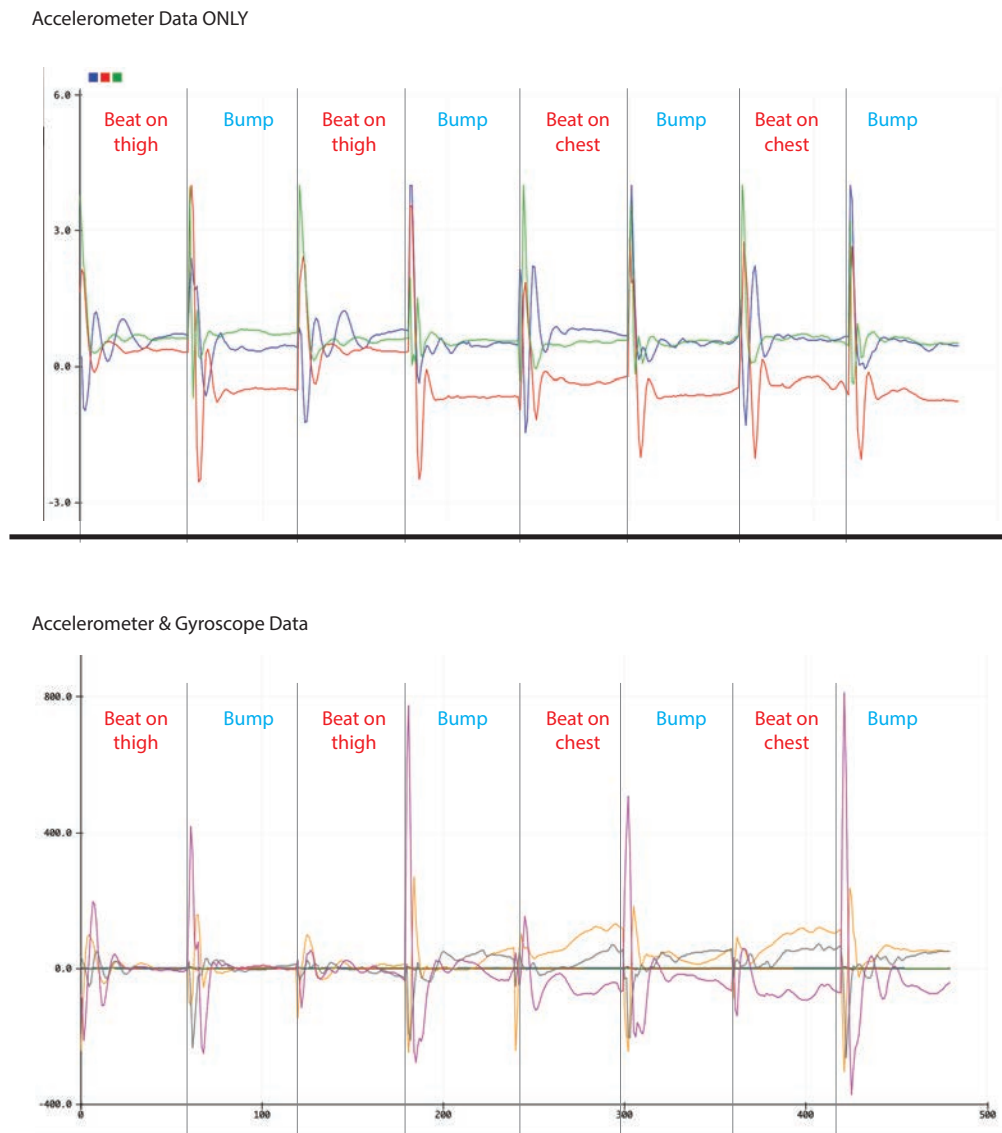


Figure 22: Arduino sensor data visualization comparing accelerometer and gyroscope readings of movement patterns, (they are not gestures yet)

<sup>46</sup> The term “Correspondances” is a direct reference to Baudelaire’s poem of the same name, and where nature’s indecipherable force can only be accessed through a synesthetic awakening of the senses. Charles Baudelaire and Claude Pichois, *Oeuvres complètes*, Bibliothèque de la Pléiade 1 (Paris: Gallimard, 2021), 11.

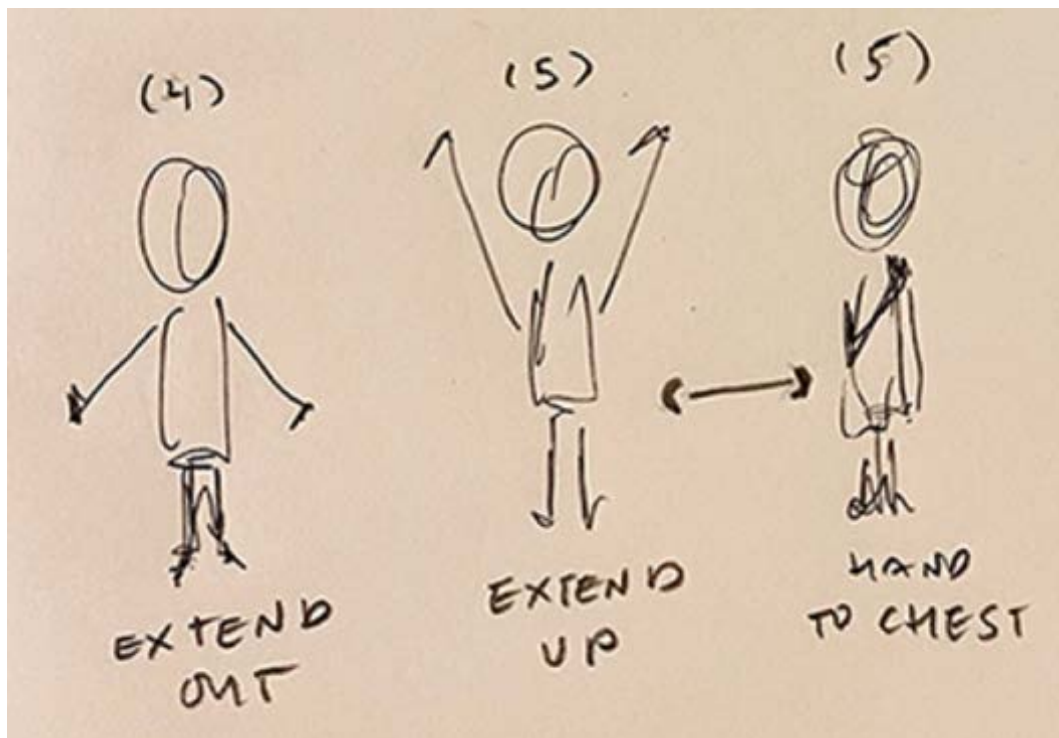


Figure 23: *Extend Out, Extend Up, Hand to Chest* (2020)

In this first order feedback loop, the human looks at what the machine tracks, and in response adds, subtracts, extends and exaggerates each motion in an attempt to turn motion into gesture. In this initial form of performative correspondance a type of decipherment and communication between human and machine begins to take place. In the second correspondance schema, the human-to-machine transposition of gestural data is rehearsed between humans, in a form of a contemporary exquisite corpse, where one human sees only the data generated but not the gesture itself, and the other performs the gesture without access to how the data is parsed and therefore without access to how the machine interprets each gesture.

In this remote play of human-to-human sharing of human-machine gesturality, the machine translates the movement that seeks to be gesture into data, and the programmer that builds the machine learning model sees the data without the originating gesture. What is then the resolution in which the originating gesture needs to be communicated to be recognized, classified, and codified so the programmer can decipher the data? While in the first case the human performs gesture for the machine so it can be turned into data, when only the data plot of x, y, and z that displays general directionality and acceleration is shared with no window to its origination, the gesture itself remains obtuse to another human, an oblique performance of resonate lines without *resonance*.





Figure 24: Early wearable prototype with embedded sensors during remote gesture analysis session with Ling Tan

And yet even a low-resolution hand drawn sketch of a tap on the thigh, a shaking of the hand, the bumping of two fists against each other, the gesture here is readable by the programmer, and in fact more readily than a video that demonstrates the same gesture. In this kind of gesture without movement, the gesture's aura and trace, that so eludes the machine, is easily communicated in an interplay of effective and affective communication.

Instead, as the machine needs to get a grip and distinguish between gestures, to detect them as separate, it looks for the spaces in between. The pauses become the spaces that affirm and enframe gesture as accelerated and gyroscopic revolutions—fluidity obscured, the accentuated, the accelerated, and the exaggerated favoured to create a library of gestures that eschews subtlety and ambiguity; for the gestures to be machine-readable they have to be



rendered machinic themselves. The more accelerated and articulated the gestures, the better the model can recognize and decipher them. Adorno's aphorism this time literally enacted for the machine's gaze: 'Do not knock.— Technology is making gestures precise and brutal, and with them men. It expels from movements all hesitation, deliberation, civility.'

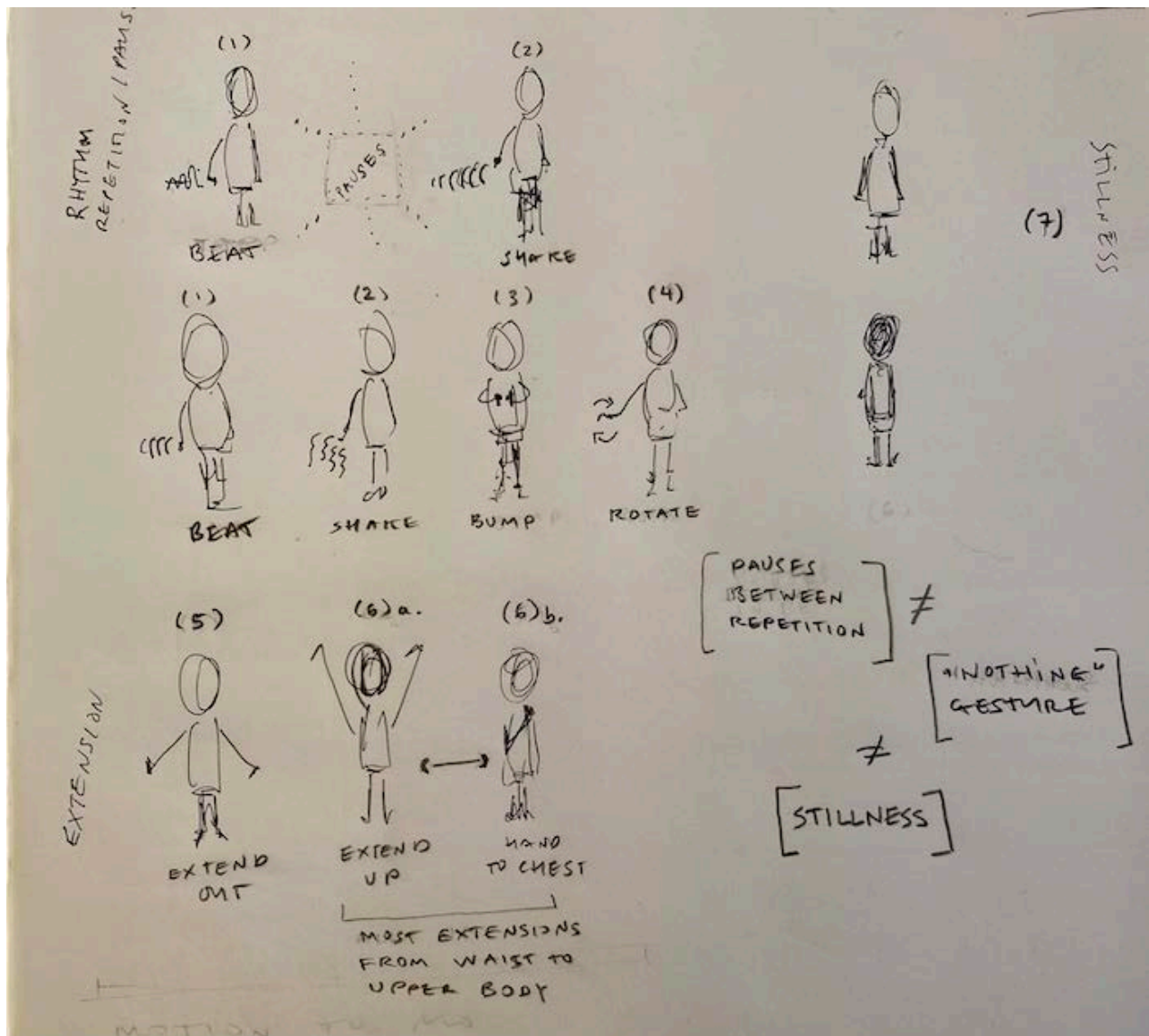


Figure 25: *Pauses Between Repetition* (2020)

To resist this technologically produced annihilation of hesitation and deliberation, and to rethink the algorithmic human-machine relationship, *Vambrace Conversations* explores entangled and evolving forms of communication with technological artifacts and algorithmic systems, through two inter-related moves. The first is by probing into how gestures are to be understood, formulated and communicated in the in-between space between action and enaction, in the space between human indeterminacy and intentionality, when gesture is performed to activate a response *from*, *for* and *with* the machine.

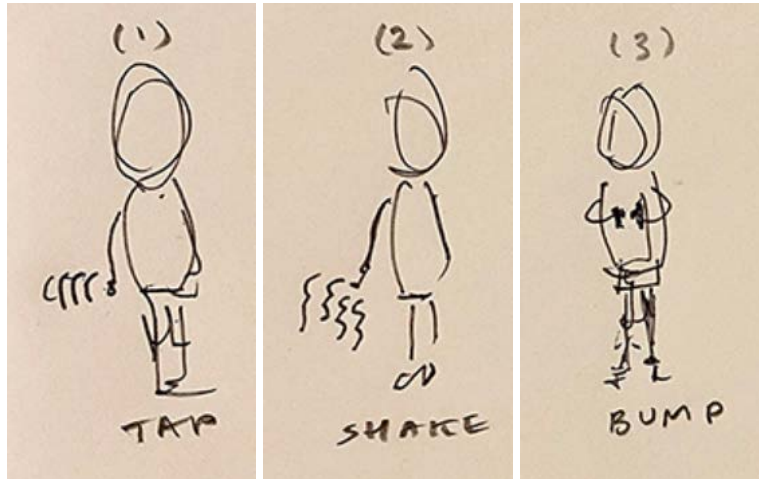


Figure 26: *Beat: tap-shake-bump* (2020)

Then, can the reactivity of the machine model that maps gesture to heat patterns evolve to one of intra-activity, or in fact, evolve at all? This teetering between decipherability and undecipherability, between curiosity, multiplicity and deferment creates a type of entanglement, where the cypher of how, in this case, different regions on the fabric heating up in response to different gestures, attempts to be understood as a playful disposition of both machine and human that resists technological functionalism but without losing all grip to meaning. The project posits that the material surface that the woven fabric constructs, along with its responsiveness and the sensuality of the heat generated by the conductive yarns, begin to bestow to this peculiar assemblage a textuality and textility that opens it up to a multiversality of communicational opportunities and trans-formations.

The heated regions, the modulation of the heat, the exploration of which gesture activates what kind of heat pattern and location, and how these evolve over time begin to form a peculiar type of intimacy between the wearable and the human. This affective emergent relationship attempts to create a type of ‘melodic line of continuous variation’ which ‘will define affect (affectus) in its correlation with ideas, and at the same time in its difference in nature from ideas.’<sup>47</sup> This Deleuzian formulation recalls Golding’s ana-materiality, a variation between presence and absence, real and non-real, an ana-material that is coherent and yet varied.<sup>48</sup>

<sup>47</sup> Gilles Deleuze, “Spinoza: The Velocities of Thought, Lecture 00, 24 January 1978 | The Deleuze Seminars,” accessed October 13, 2022, [deleuze.cla.purdue.edu/seminars/spinoza-velocities-thought/lecture-00](https://deleuze.cla.purdue.edu/seminars/spinoza-velocities-thought/lecture-00).

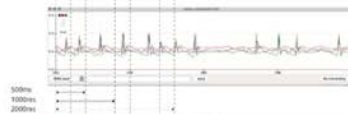
<sup>48</sup> Golding, “Ana-Materialism and the Pineal Eye.”



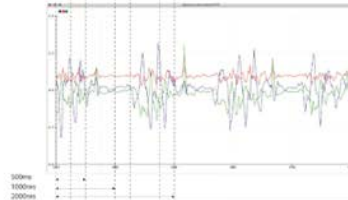
Figure 27: *Gestures of Gestures* (2023)

# Accelerometer data to scale across all gestures

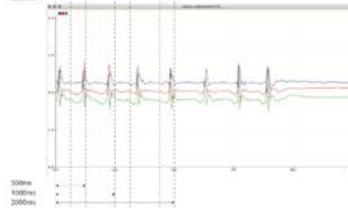
beat



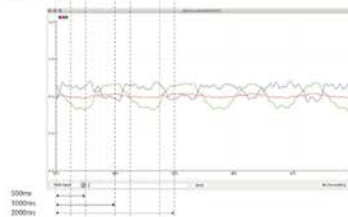
shake



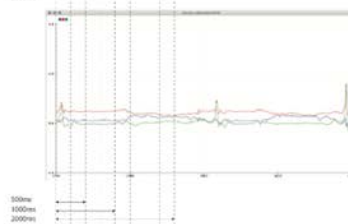
bump



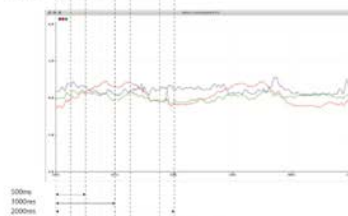
rotate



extend out



extend up -  
raised arm



extend up -  
arm to chest

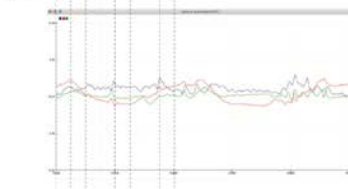


Figure 27: Machine sketches of gestures of gestures

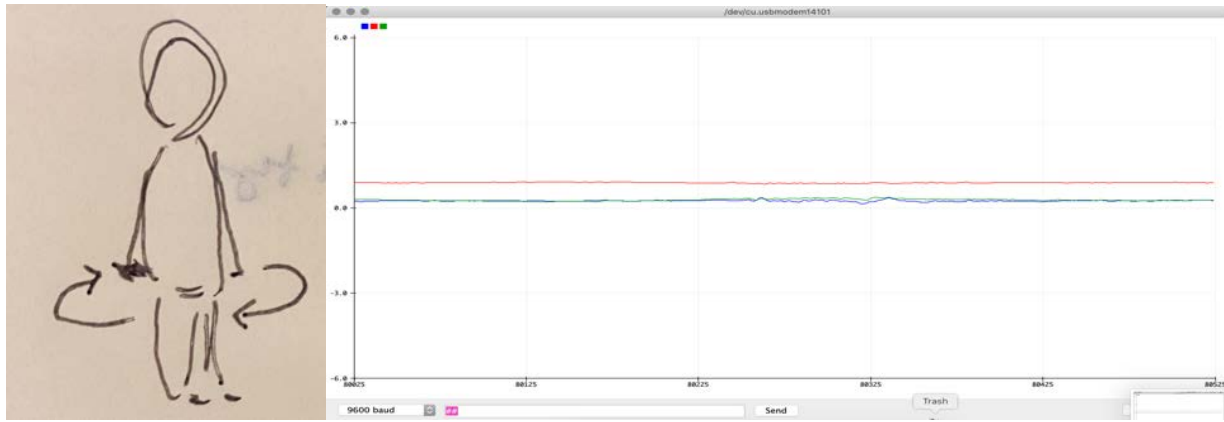


Figure 29: 7c.hand hanging next to body - hand still - body swinging slightly, 2021, ink on paper and Arduino generated graph

The machine learning model that is adopted in *Vambrace Conversations* in a first attempt to create some form of exchange between machine and human uses beat as gesture. Pauses between beats create both gesture and rhythm, adding an additional layer to the exchange. Yet longer pauses take the form of a nothingness in motion, demonstrating that a nothing gesture is for human and machine alike an ontological and technical impossibility and a baseline that defies both. What is probed here is whether meaning then can be extracted from this exchange. In this limited alphabet of heat and gesture, and the punctuation marks of pauses and spaces entertain the possibility of an open ended conversational algorithmic model that revisits functionalism and instrumentality.

The intention is not to anthropomorphise artificial intelligence, nor claim the possibility of an emotional life in the machine or even an emotional attachment to one. Instead, by using machine learning to develop a nuanced and yet intentional relationship between human and machine, the expressive and creative affordances of human-data interactions with artificial intelligences are probed.

*Transitional Object II: Vambrace Conversations*, along with *Transitional Object I: Alive Like Style Free Companion*, ultimately aim to investigate what an emergent inhabited logic of the senses entangled with technological artifacts and artificial intelligences can start to look like based on the grid that emerges from such entanglement. This move is in direct resistance to the binary, linear, articulated, and opportunistic uses of machine learning models that purport to 'explain and predict any sort of human behaviour.'<sup>49</sup> The work also aims to expose the limitations of the types of 'techno-intelligence' that have 'led to the explosion of non-conscious

<sup>49</sup> Shoshana Zuboff, *The Age of Surveillance Capitalism: The Fight for the Future at the New Frontier of Power* (London: Profile Books, 2019), 425.

or pre-cognitive decisions' informed by sensor-based pattern making models.<sup>50</sup> It argues that by introducing the sensory and skin as surface and interface, both by responding to actuations initiated by algorithmic models and as a way to inform them, is an important step in expanding the arena of technical systems.

Many of the non-conscious algorithms that N.K. Hayles describes as 'creating situations in which the human cognitive nonconscious, technical cognition, and human consciousness interact in real time through multiple feedback loops and recursive circular causalities to create a cognitive assemblage of unprecedented surveillance potential,' depend on sensor based feedback loops that entirely disregard the logic of sensation.<sup>51</sup> As Luciana Parisi notes, the emergence of 'a self-aware general intelligence' is 'turning symbolic values into lifestyles, and rules into experiential qualities.'<sup>52</sup> Sensor networks and machine vision produce a datafied version of affect that produces a 'cartoon sketch' of the corporeal self, a self without skin, indeterminacy or playfulness.<sup>53</sup>

*Transitional Object I & II* bring the surface of the skin and materiality to the fabric of technology as a call for a relationship to otherness, always complex, always intertwined. Here technology is positioned as the Other, that for Deleuze 'assures the margins and transitions in the world.' Instead of indexing and patterning, the technological Other that the practice develops hopes to open-up a possibility of transformation of form—both the form of the body and that of technology— and expose the 'variations of depth' that are absent in discourses with technology.<sup>54</sup>

These works do not assume or pertain to the formation of an intimate relationship with technology itself, or for technological artifacts to become inanimate friends. Still, in her essay on *Friendship*, Golding describes friendship as an open exchange, 'a certain kind of attunement (-listening), a certain kind of reaching out (-event); a certain kind of response (-ability), a certain kind of respect (-fullness), and a certain kind of play (-time).' These fundamental elements of friendship are introduced to algorithmic logics in an attempt to yield 'an inhabited logic of the

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<sup>50</sup> Luciana Parisi, "Critical Computation: Digital Automata and General Artificial Thinking," *Theory, Culture & Society* 36, no. 2 (March 2019): 89.

<sup>51</sup> Hayles, *Unthought*, 131.

<sup>52</sup> Parisi, "Critical Computation," 104.

<sup>53</sup> Kate Crawford, *Atlas of AI: Power, Politics, and the Planetary Costs of Artificial Intelligence* (New Haven: Yale University Press, 2021), 179.

<sup>54</sup> Gilles Deleuze, *Logic of Sense*, trans. Constantin V Boundas, Mark Lester, and Charles J Stivale (London [etc.: Bloomsbury, 2015), 305.

senses.<sup>55</sup> This logic of the senses then challenges algorithmic models that seek to index emotion and affect, under a ‘social project of functionalism’ that is ‘based on the notion that man was fundamentally ruly,’ and instead asks of them to be, well, unruly friends who are attuned to the modulations of skin as opposed to surveillance functionaries.<sup>56</sup>

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<sup>55</sup> Johnny Golding, “Friendship,” in *The Edinburgh Companion to Animal Studies* (Edinburgh: Edinburgh University Press, 2018), 262.

<sup>56</sup> Joan Copjec, *Read My Desire: Lacan against the Historicists* (Cambridge, Mass: MIT Press, 1994), 85.



### ***Transitional Object I: An Alive Like Style Free Companion***



Figure 30: *Alive Like Style-Free Companion* (2020)

*Transitional Object I: [An Alive Like Style Free Companion](#)* explores such an unruly friendship while at the same time investigates markers of aliveness in technological artifacts, along with vulnerability, playfulness and an emergent type of companionship between machine and human. *Alive Like* is what Sheryl Turkle calls a ‘marginal object’ whose ambivalent place in the world straddles between practices and intentionalities and plays an important part on how lines are drawn, in this case, between machine and human, playfulness, agency and materiality.<sup>57</sup>

The work also looks to introduce a performative foundation to relations with artificial intelligences along with ‘enchantment,’ a quality that Lucy Suchman argues is an important aspect in relationships with technological artifacts and one that can safeguard the displacement ‘of the biological individual with a computational one.’<sup>58</sup> In the process the work also looks to reframe and accentuate the network of social and material relations and the aesthetic, political and social implications that human and machine assemblages evoke.

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<sup>57</sup> Sherry Turkle, *The Second Self: Computers and the Human Spirit*, 20th ed. (The MIT Press, 2005), 35, <https://doi.org/10.7551/mitpress/6115.001.0001>.

<sup>58</sup> Lucy Suchman, *Human-Machine Reconfigurations: Plans and Situated Actions*, 2nd ed. (Cambridge University Press, 2006), 256, <https://doi.org/10.1017/CBO9780511808418>.



*Alive Like* is a collaboration with BLESS, founded by Desiree Heiss, and Ines Kaag; Heiss and Kaag describe BLESS as a “visionary substitute to make the near future worth living for, and a project that presents ideal and artistic values by products to the public.”<sup>59</sup> The making of *Alive Like* also involved the creative technologists and architects Ling Tan and Usman Haque, bringing together fashion, design, engineering and an open-ended experimentation with emerging materials and computational architectures.<sup>60</sup> Deiqi Sun, an electrical engineer and artist helped with further miniaturising and assembling the electronic components that were custom-manufactured in China, demonstrating once again the complex and interdisciplinary skill-set required to bring new material configurations to life.

A thin silk fabric, the top part of a re/deconstructed top-bottom garment and part of a series of garments developed by BLESS by salvaging fabrics from discarded clothes or rolls of fabric, is embroidered with an almost invisible conductive thread. The conductive thread follows the pattern of the silk fabric, maintaining all the sensory characteristics of silk both in its hand and drape. Two micro-fans are sewn on each side of the top and connected to a miniaturized circuit that is programmed to monitor how often the garment is disturbed from its position of rest.<sup>61</sup>



Figure 31: Detail of conductive yarn embroidered along the fabric's pattern

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<sup>59</sup> <https://bless-service.de/pages/info>, accessed June 1, 2024 –BLESS’ cross-disciplinary practice and their interest in the uses of technology drove this partnership. The design of *Alive-Like* was based on a series of re-assembled garments they had produced in the past. BLESS was involved in every aspect of the development of this hybrid garment as it is virtually impossible to ‘retro-fit’ this kind of technology onto an existing garment.

<sup>60</sup> <https://haquetan.com/>, accessed June 1, 2024

<sup>61</sup> [http://www.blessberlin.com/BLESS\\_new/N/Entries/2000/3/28\\_N10\\_Scarfs.html](http://www.blessberlin.com/BLESS_new/N/Entries/2000/3/28_N10_Scarfs.html), accessed June 1, 2024



Figure 32: Custom electronics that drive *Alive Like* and connected with conductive thread

If left unattended for too long, when the scarf is picked up again it heats up to an almost uncomfortable level as to indicate annoyance for its neglect, and only after being worn for a while it slowly starts emanating a pulsating soothing heat level, while the four fans emulate different breathing patterns to communicate boredom, neglect, aliveness and presence. As garments are not meant to breathe nor are they supposed to declare their annoyance for not being used, *Alive Like* asks questions about embedding such characteristics into an in-animate, technologically driven system.

*Alive Like* takes on Chris Chesher's proposal to engage with the concept of *avocation*, used to describe the 'arrangements and affordances' through which individuals are invited to enter relationships with technological assemblages as active agents that manifest the sociomaterial agency of both human and machine. These assemblages do not only look at efficiency and an instrumental relationship with technology but invite uncertainty and a break

from the quotidian. Chesher develops the concept of *invocation* as a critical component in interactions with human-machine assemblages that have the capacity to transform the assemblage itself. Finally, Chesher uses the term *evocation* to describe the affective and effective material changes that result in such transformations, both based and promoting the importance of materiality in how relationships with technological artifacts are framed and developed.<sup>62</sup>

This idea of materially based transformation is what firmly situates *Alive Like* against critical or speculative design; the scarf can only function as a platform of material inquiry because it is fully integrated and actualised with all the extracted knowledge this process of materialisation entails and experienced as an actual and not speculative garment. Collaborating with fashion designers and technologists, devising new solutions for connecting soft-and-hard surfaces, developing a methodology and a production timeline that accounts for the particularities of embedding electronics into surfaces that drape the body, assessing and developing custom power management circuits, these are materially based challenges that create new potentialities and sociotechnical assemblages and cannot be explored in theory alone.



Figure 33: Mock-up for laying out the electronic components and conductive heating pattern for *Alive Like*

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<sup>62</sup> Chris Chesher, *Invocational Media: Reconceptualising the Computer* (New York: Bloomsbury Academic, 2024).

Machine learning in its simplest instantiation is used to construct a relationship of use and abuse between user and object, while the two most basic signifiers of a body's aliveness, heat and breath, are transferred onto a worn surface in order to offer a radical re-materialisation of technological objects and their relationship to the human body.

The result is a hybrid object that evokes a feeling of uncanniness, for some users experienced as disturbing, for others welcoming, but always peculiar and unexpected. The four micro-fans, placed on the periphery of the top part of the garment produce a rhythmical breathing effect as the fabric balloons and falls back to its deflated state. The heated pattern, itself capricious and always a result of how often the object is worn or moved, adds both an ephemerality and endows the object with agency and intentionality even though this is a programmed one. As Sherry Turkle notes, humans in their hunger for recognition easily project relationships of mutuality with 'even very simple relational artifacts.'<sup>63</sup> As the relationship with technological objects has become increasingly entangled and a key component of surveillance capitalism, how these relationships are framed and what alternative visions of the future they can propose becomes a critical social and political issue and with deep ramifications for encounters between humans, between humans and their inner selves and between humans and machines. Key in this encounter is the notion of vulnerability and affect and the kind of grids, boundaries and demarcations, material, sensory and conceptual that enable the encounter to take place.

Notions of vulnerability and how they can be transferred to the field of soft robotics to introduce embodiment to algorithmic logics are explored by researchers in different ways. One example where human bodies forfeit touch immersed in virtual and digital spaces in a process of discretization and dematerialization that escapes the painful cycles of flesh, is at the Daegu Gyeongbuk Institute of Science and Technology (DGIST) in Korea where android robots along with electric sheep they now dream of pain.<sup>64</sup> 'Ouch, ouch, ouch' a female voice chirps as a dotted sensor array is pricked with an instrument; 'hot, hot, hot' the voice now calls as a hot probe touches the sensing dots.

Researchers at DGIST are developing a sensor that aims to detect and form 'psychological feelings' akin to pain sensations by demonstrating a "tactile sensor system that is capable of detecting or generating 'pain' from pressure and temperature variables, with signal

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<sup>63</sup> Turkle, *The Second Self*, 288.

<sup>64</sup> Philip K Dick, *Do Androids Dream of Electric Sheep?* (New York: Random House US, 2008).



processing by mimicking the human tactile sensing system for feeling ‘pain’ [...] using a ‘pain-feeling algorithm’ capable of multichannel sensing.”<sup>65</sup> The researchers theorize that a machine capable of ‘feeling’ pain will avoid harming itself in harsh environments and minimize potential damage and breakdowns. Additionally, the researchers deduce that humans ‘are careful not to give pain to others’ because they ‘know’ what pain feels like themselves, ergo a ‘machine that cannot know or feel pain can hurt humans or itself.’ But if the socio-ethical and psycho-sensual pain sub-ensembles are used as a model for machines eschewing violence against humans, or themselves, there is little hope that machines will be deterred from harming anyone. One is tempted to ask what kind of normativity or naïveté disregards the politics of torture, the tingling edges of cathartic pain in sexual practices, not to mention the variable modes of self-harm and self-destructive tendencies, from deferred to immediate, and on the basis of what type of materiality is the pain-algorithm configured. It is important to note that what the researchers have produced is a tactile sensor array that can detect pressure and temperature differentials, and it is this that they term the ‘pain algorithm,’ or as they write in the conclusion of their paper it is ‘a system [that] enables pressure and temperature stimuli to be detected and verified in a manner equivalent to an intelligent human brain.’<sup>66</sup> The ‘pain algorithm’ in this case is in fact only a single tactile sensor that is able to detect the difference between pressure and temperature differentials.

The insistence on anthropomorphizing machines and modelling them after a reductivistic, mechanistic and homogenous yet disconnected version of the human body, a body that lacks the Freudian body-ego, with electronic skin but no flesh or viscera, fails both machines and humans alike.<sup>67</sup> As Barbara Johnson aptly notes, in what can be read as a both a critique of the feeling-machine’s imperative to protect humans from harm as well as a critique of Object Oriented Ontology, ‘the more I thought about this asymptotic relation between things and persons, the more I realized that the problem is not, as it seems, a desire to treat things as persons, but a difficulty in being sure we treat persons as persons.’<sup>68</sup> No safeguards here for pain-feeling machines protecting pain-feeling persons.

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<sup>65</sup> Minkyung Sim et al., “Electronic Skin to Feel ‘Pain’: Detecting ‘Prick’ and ‘Hot’ Pain Sensations,” *Soft Robotics*, July 23, 2019, 2, <https://doi.org/10.1089/soro.2018.0049>.

<sup>66</sup> Sim et al., 13.

<sup>67</sup> Sigmund Freud, *On Metapsychology: The Theory of Psychoanalysis: Beyond the Pleasure Principle, the Ego and the Id and Other Works*, trans. James Strachey (London: Penguin Books, 1987).

<sup>68</sup> Barbara Johnson, *Persons and Things*, 1. Harvard Univ. Press paperback ed (Cambridge, Mass.: Harvard Univ. Press, 2010), 2.

In this twist, where the ontological boundary between subjects-objects-things-machines collapses, human bodies are reduced to feedback loops where homeostasis and self-regulation become paradigmatic of the strive to exist. In the abstract referenced earlier titled *Homeostatically Motivated Intelligence for Feeling Machines* the neurologist Antonio Damasio sees an ‘intriguing correspondence between the biological architecture of sensory convergence and some variants of deep neural networks.’<sup>69</sup> For Damasio such a convergence is made plausible with the development of soft robotics clad with ‘tissue-like’ computational materials and by building machines that follow homeostatic principles of life regulation that, in this case, rely on (algorithmic) feelings that Damasio closely associates with the biological basis of selfhood.

While Damasio and the DGIST researchers do not reference each other, curiously they both see the machine’s physical vulnerability as closely related to its aversion to pain which in turn is regulated by the ‘multi-channel pain algorithm’ that generates a version of feelings; when *Homeostatically Motivated Intelligence for Feeling Machines*, meets *Electronic Skin to Feel Pain* the pain algorithm will enable ‘biologically authentic implementations of feeling in machines’ bringing Pinocchio back to Gepetto’s loving household once and for all.<sup>70</sup> Here, machines mimic humans who mimic machines, where signals, in this case pain, are understood as information flows to be decoded in a passage from exterior cause to interior affect. The porous membrane, where affect takes place and the intra-active virtuosity of a dynamic dance between bodies and their environment is non-present. While intelligent machines rely on machinic, algorithmic bodies that strive to reduce the complexity of bodily matter to information flows and homeostatic systems where feelings are the result of information processing and a monotonic response to the vicissitudes of the environment, chromatin biology tells a different story and one that informs how the grid of the encounter and boundaries are being rethought.

Chromatin is the tightly packed complex of proteins and DNA found in the cell nucleus; the iconic double helix of the DNA, so closely associated to a fixed and timeless biological identity, does not exist in cells in a naked form. Instead, it lives in a state of chemical affinity with proteins and it is this complex called chromatin that is the stuff of chromosomes.<sup>71</sup>

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<sup>69</sup> Man and Damasio, “Homeostatically Motivated Intelligence for Feeling Machines.”

<sup>70</sup> *Pinocchio* is a common reference in robotics; it is also the name of a C++ library for dynamic computations focusing on robotic, computer animation and biomechanical applications [<https://stack-of-tasks.github.io/pinocchio/>].

<sup>71</sup> Hannah Landecker, “The Social as Signal in the Body of Chromatin,” *The Sociological Review* 64, no. 1 (March 2016): 94.

What chromatin biologists are finding out is that '[c]hromatin, unexpectedly, has become an image of bodily time, in which history and anticipation are written, rather than the mechanistic turnings of response and homeostasis.'<sup>72</sup> Or as Deleuze would put it, '[t]he retained past appears in the form of cellular heredity.'<sup>73</sup> The deterministic inscription of being as represented in the DNA and genome biology is upended by a post-genome view where a dynamic organism's environmental experiences originating outside the body change the three-dimensional shape of the chromatin fiber inside the body.<sup>74</sup>

The chromatin's very shape changes in a constant dynamic flow, from egg to embryo to foetus and throughout the various stages of the life of the body. This topological, spatial, temporal dynamism of chromatin and how it transduces signals across bodies, time, space— this is an encounter that cannot be arbitrated by 'the mechanistic turnings of blind response and homeostasis,' quickly rendering the feeling-robots singular, jejune and unprepared to respond to the multiplicity and transformability of bodily matter.

In a process of transduction, events and their physical, biological, mental and social milieu are negotiated on the topos of a cellular membrane. As they are propagated, from one material medium to another, they are imprinted as an interior past, a complex of organic memory and affective inner world, a domain of structuration that projects an exterior future, pregnant with affective encounters and anticipated by habit.<sup>75</sup>

The biologist and general systems theorist Ludwig von Bertalanffy, wrote in 1950 'living forms are not in being, they are happening; they are the expression of a perpetual stream of matter and energy which passes the organism and at the same time constitutes it.'<sup>76</sup> This perpetual stream of matter recalls Lucretius' kinetic stream of matter and Lyotard's openness of thought, yet another material reality that forms being, as fundamentally resisting the procedures for controlling time, a becoming of a 'not-yet' determination.<sup>77</sup>

Instead, the electronic skins that feel pain and Damasio's algorithmic feeling-machines are predicated on bioinstrumentation and calculability of material flows, now structuralized in data

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<sup>72</sup> *ibid*, p.96

<sup>73</sup> Deleuze, *Difference and repetition*, 73.

<sup>74</sup> Martine Lappé and Hannah Landecker, "How the Genome Got a Life Span," *New Genetics and Society* 34, no. 2 (April 3, 2015): 153, <https://doi.org/10.1080/14636778.2015.1034851>.

<sup>75</sup> De Boever, *Gilbert Simondon*.

<sup>76</sup> Ludwig von Bertalanffy, "The Theory of Open Systems in Physics and Biology," *Science* 111, no. 2872 (January 13, 1950): 23–29.

<sup>77</sup> Jean-François Lyotard, *The Inhuman: Reflections on Time* (Stanford, Calif: Stanford University Press, 1991), 74.

ontologies. In this algorithmic ontology identity becomes once again fixed and immutably represented in the regressive and reductionistic constancy and essentialism of the DNA.

These data-somatics, an amalgam of biological and ‘digital phenotyping,’ follow the same epistemic and ontological algorithmic determinations that insidiously circumnavigate private bodies, their public enactments and the points where the two collide.<sup>78</sup> These collisions, once entangled, are now vectorized, plotting the potentiality of identity on a dimensional plane. Are we back on a flat earth? At times algorithmic culture appears as a regressive turn to *Flatland*, where planarity is the logic behind misogyny, fascism, and the suppression of multiplicity of form and dimensions.<sup>79</sup>

*Alive Like* positions itself as a membrane that transduces signals between human and garment and brings to life a temporal dynamism and resists the ‘instrumentarian collective,’ ‘reality mining,’ data-somatics and sensor grids that wearable technologies have been driven towards in the past decade.<sup>80</sup>

The implications of wearables on the social landscape that Susan Elizabeth Ryan explored in *Garments of Paradise: Wearable Discourse in the Digital Age*, one of the few critical studies of wearable technologies, have now a new bearing and edges. Ryan foresaw a future where wearables function as performative acts of embodied sociality that overcomes the virtualisation and dematerialization of communal spaces and identity.<sup>81</sup> While this vision has yet to come to bear, it is exactly the interlocution between identity, space and technology that *Transitional Object I: An Alive Like Style Free Companion* seeks to formulate, introduce flow, unpredictability and an aesthetic dimension to the making of wearable environment that avoids what Simon Penny calls the phenomenon of ‘disappearing aesthetics’ when discussing artists working with technology.<sup>82</sup>

The relationship between the performativity of the body, along with a focus on sensorial exploration, where hard and soft materials become conduits for a dual and fluid transience

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<sup>78</sup> The term “digital phenotype” was coined by Jukka-Pekka Onnela, an Associate Professor of Biostatistics at Harvard, in 2015 to describe the quantification of the individual-level phenotype based on passively and actively aggregated digital data. Individuation here takes place as quantified biomarkers are transduced through an epistemology of data that constitutes, and is constituted, by algorithmic ontologies.

<sup>79</sup> Edwin Abbott, *Flatland: A Romance of Many Dimensions*, Reissued, Oxford World’s Classics (Oxford: Oxford Univ. Press, 2008).

<sup>80</sup> Zuboff, *The Age of Surveillance Capitalism*, 425.

<sup>81</sup> Susan Elizabeth Ryan, *Garments of Paradise: Wearable Discourse in the Digital Age* (Cambridge, Massachusetts: The MIT Press, 2014), 4.

<sup>82</sup> Simon Penny, ed., *Critical Issues in Electronic Media*, SUNY Series in Film History and Theory (Albany: State University of New York Press, 1995).



between materiality and immateriality in the making of *Alive Like* draws inspiration from Lygia Clark's *Nostalgia for the Body* series starting in 1964, and through embodied explorations forge a new breed of material connections. In *Sensorial Gloves* (1968) Clark dissolves the separation between object and subject, exploring the sensuality of touch and its kinesthetic relationship to perception, action, and the continuity of being, the making of the body as it manipulates objects.<sup>83</sup> It is this kind of sensibility and the formation of a new type of grid between body and machine that *Alive Like* explores, where touching touch at once negates and affirms Merleau-Ponty's 'reversible reflection.'<sup>84</sup> Embodied cognition and a move away from representation and towards a structural coupling that brings the world forth, is explored by looking at the performativity of the body as it moves in unpredictable and flowing ways, looking at gesture, heat, and motion as the building blocks of a connected being in *Transitional Object I & II*.<sup>85</sup>

A different type of performativity and connection with the onto-epistemological takes place in the number poems by the British poet Neil Mills. In the number poems Mills reads a series of numbers, sometimes only two (1, 2) but in seemingly random order, rhythm and intonation, and with varied spacing between each utterance. The result verges on a monotony but never touches it, and instead, turns the human voice and the temperamentality of each enunciation into an open system, and as he notes, yields an 'unexpected lyrical or evocative content.' Mills writes that at the time he 'believed that the meaning which emerged in the reading of poetry lay primarily in intonation and rhythm, and only secondarily in semantic content.'<sup>86</sup>

While Mills's poems in their numericity recall algorithmic constructs, and even generative poetry, in fact the *Number Poems* form an aural landscape where words and the human voice result into a synesthetic materiality that is distinctly absent in generative poetry, where the immateriality of the algorithm acquires a spectral form.

It is such synesthetic materiality and the formation of a pre-cognitive embodied atmosphere that *Transitional Object I & II* seek to create by reframing what the relationship with both an unruly self and technology can be and one that creates an encounter based on a dynamic and fluid membrane between the self, body and its surrounding environment.

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<sup>83</sup> Lygia Clark, *Sensorial Gloves*, 1968. Part of her *Nostalgia of the Body* series, Clark's gloves are made of various materials, sizes and textures.

<sup>84</sup> Maurice Merleau-Ponty, *The Visible and the Invisible: Followed by Working Notes*, ed. Claude Lefort, trans. Alphonso Lingis, Northwestern University Studies in Phenomenology & Existential Philosophy (Evanston: Northwestern University Press, 1968).

<sup>85</sup> Francisco J. Varela, *The Embodied Mind: Cognitive Science and Human Experience*, revised edition (Cambridge, Massachusetts ; London England: The MIT Press, 2017), 204.

<sup>86</sup> Goldsmith, Kenneth, and Robert C. Cottrell. *Uncreative Writing : Managing Language in the Digital Age*, Columbia University Press, 2011

*Transitional Object I & II* rethink the concepts of grid and pattern by expanding the grid into a multidimensional space that incorporates physical textures and the malleable surfaces they create, digital information in the form of machine learning models, sensory feedback, human gestuality and movement. As a result, a dynamic patterning emerges that evolves based on human interaction and its relationship to machine learning algorithms, time and use. *Transitional Object I & II* re-imagine the grid as something that extends beyond material surfaces and looks at skin as interface and sensory feedback as output. This in turn challenges traditional notions of where technology ends and the human begins.

Pattern and patterning is repositioned to go beyond visuality and account for tactility, temporality and the rhythms of interaction and gestuality. Here grid and pattern create a sensory, sensual and experiential space where the encounter manifests its embodied multiversality and inherent performativity. By incorporating elements of unpredictability in evolving machine learning models, these works introduce a stochastic aspect to the grid and pattern that engages with notions of emergence and complexity.

Importantly, affect is introduced as a part of pattern that jumps off a multiversal grid, moving beyond the idea of pattern as a functional or aesthetic category. Affect emerges from a view of multiple interconnected grids that bring together the physicality of hybrid materialities, the conceptual grid of the architectures that inform machine learning models and the sensory grid of human perception. Finally, the concept of memory and its relationship to affect, for both machine and human, is explored in *Transitional Object I & II* through an engagement with temporality, atonality, rhythm and repetition, and where a sensory and conversational grid begins to emerge in the process of active making.

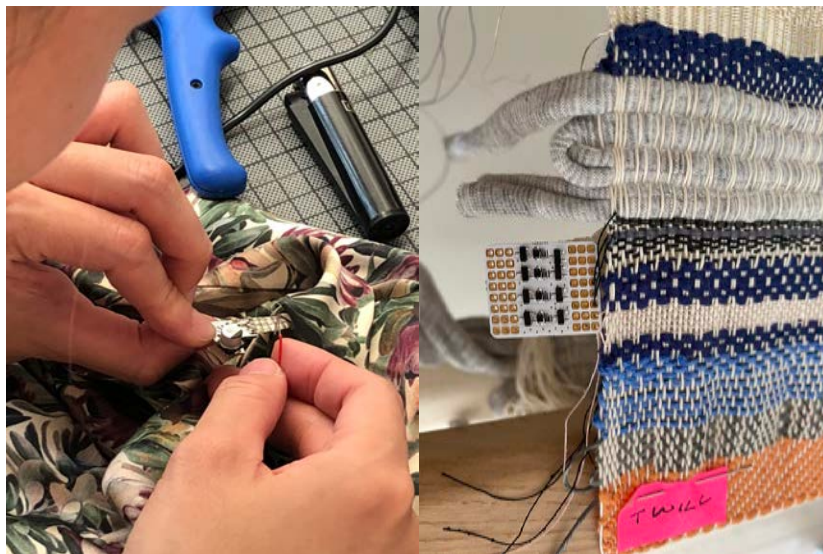


Figure 34: Tools of the Trade, hand-embedding of electronic components for *Alive Like* and experimenting with various weaves for *Valence Conversations*- making as integral to thinking

### Chapter 3: Pattern Recognition: Between the Poetic and the Algorithmic



Figure 35: *Ali Baba and the 40 Thieves (in Indigo), Capitalism and its Discontents* (2024)

*Pattern Recognition: Between the Poetic and the Algorithmic* proposes an approach to multimodality, where '[m]ulti-modal machine learning aims to build models that can process and relate information from multiple modalities,' that challenges both the understanding of multimodality and that of pattern.<sup>1</sup> Here pattern emerges as a topological surface encounter, a rubbing of sorts between the edges and boundaries of image assemblages and the encounters that take place around and between them. Affect becomes a constitutive component of this surface and one that includes volume, energy, intensity, depth, vibration, and resonance.

While chapter one looks at short videos sketches that introduce affect as a spontaneous and embodied narrative materiality, chapter two looks at intricate weaves composed of performance and conductive yarns woven on a loom and then embedded by hand with sensors that explore skin as interface; interface being a laden term that in the age of machine learning

<sup>1</sup> Tadas Baltrušaitis, Chaitanya Ahuja, and Louis-Philippe Morency, "Multimodal Machine Learning: A Survey and Taxonomy," *IEEE Transactions on Pattern Analysis and Machine Intelligence* 41, no. 2 (February 1, 2019): 423–43, <https://doi.org/10.1109/TPAMI.2018.2798607>.

fuses subject and object and blurs the boundaries between them. This move provides elasticity and porosity to the grid itself while at the same time questioning sensor based haptic computational communication and its ability to account for gestuality.<sup>2</sup> In the cross-weavings of chapter two what is explored is affect's 'abstractivity' that makes it 'transmittable,' a quality that 'is potentially such a powerful social force' as Eric Shouse notes and becomes a beckoning to consider the social potentiality and implications of affective human-machine assemblages.<sup>3</sup> In the chapter *Pattern Recognition*, informed by the previous two—how affect unfolds in the embodied materiality of the grid of pixelated video coordinates and in the weft and warp of the loom where abstract patterns of communication between human gesture and algorithmic logics are explored—pattern resists the notion of 'pattern recognition' as understood in machine learning and AI discourses that seek to establish meaningful regularities.<sup>4</sup>

While pattern recognition is the basis of machine learning / AI discourses which aim to establish such meaningful regularities, this chapter looks at how affect and affective representation 'participates' differently in the establishment of sense making. In chapter one this is done via the grid of pixelated video coordinates and as a practice of unmediated performativity, inspired by the work of Joan Jonas and Bruce Nauman, and in chapter two by subverting the coordinates of the weft and warp of the loom, something that both Anni Albers and Beryl Korot have explored extensively. Albers' work has consistently broken the grid of the loom and provides malleability and a layered tactile sensibility to her woven structures.<sup>5</sup> Beryl Korot, in *Text and Commentary* combines weaving with a 5-channel video where the multiple video channels are treated like threads and in the process complex multimodal non-verbal narratives emerge.<sup>6</sup>

Based on such an expanded understanding of the grid and through a dialogue with machinic infrastructures, pattern here advocates for a poetic imaginary and affective ephemerality that can release the Blochian 'non-yet-conscious,' adopted by José Esteban Muñoz as a utopian feeling. Muñoz proposes hope as a methodology that critically and performatively casts a backward glance to enact more inclusive visions of the future and the

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<sup>2</sup> David Parisi, *Archaeologies of Touch: Interfacing with Haptics from Electricity to Computing* (Minneapolis: University of Minnesota Press, 2018), 268–69.

<sup>3</sup> Eric Shouse, "Feeling, Emotion, Affect," *M/C Journal* 8, no. 6 (December 1, 2005), <https://doi.org/10.5204/mcj.2443>.

<sup>4</sup> Tarleton Gillespie, "The Relevance of Algorithms," in *Media Technologies*, ed. Tarleton Gillespie, Pablo J. Boczkowski, and Kirsten A. Foot (The MIT Press, 2014), 167, <https://doi.org/10.7551/mitpress/9780262525374.003.0009>.

<sup>5</sup> Albers et al., *On Weaving*, 44–47.

<sup>6</sup> Beryl Korot, "Text and Commentary (1976)," *PAJ: A Journal of Performance and Art* 24, no. 2 (May 1, 2002): 13.

not-yet-here of ‘associative argumentation and evidencing.’<sup>7</sup> Such a critical backward glance and associative argumentation is something that algorithmic logics are unable to perform today as they depend on a recapitulation of established normativities with all the biases and gridlocks these entail.

The image-assemblages produced here are borne out of conversations between exteriority and interiority, snapshots of an enfolding landscape that produces complex narratives and visual poetics. One such example is *Ali Baba and the 40 Thieves (in Indigo), Capitalism and its Discontents*, the image assemblage that opens this chapter; what follows is how these assemblages come to be and the kind of conversations that they enter in with Large Language Models, in this case with Claude, Anthropic’s LLM.

Most mornings I walk my dog by the Valentino Pier Park. Today, as we walk together and I look out to the horizon a cargo ship passes the statue of Liberty, it’s forecastle and lady Liberty perfectly frame the loaded containers. It is a perfect day; the brightness and light remind me of September 11 even though it is November 1<sup>st</sup>, courtesy of climate change, and the cargo ships. The same evening at 10:22:50 PM I take a photo of my computer screen; I like the music playing on NTS radio (a frequent companion in these travels), Johan Strauss’ *II, Indigo und die vierzig Räuber* —it is easier than making a note of it in a piece of paper I will most likely misplace. Then another photo: a worn-out jeans tote bag next to its brand-new twin under a UV light. I print all three images and tape them on the wall. I do not even really think about the *Indigo* in the Strauss’ piece and the blue of the UV light until I see them together even though it is now such an obvious connection. The images themselves, as they sit next to each other concoct an unexpected narrative, ‘kinking’ their individual meaning and revealing intricate pathways between them.

Twenty minutes into a conversation with Claude that has started with the question “how do you reference in an academic text a still from a video? How does that look: “Still from \*Untitled, \*video, 00:07 sec., 2019” is there a better way to do this?” [and having ‘shared’ with Claude the first chapter of *The Unruliness of Matter*] I upload the triptych that I have just titled *Ali Baba and the 40 Thieves (in Indigo), Capitalism and its Discontents*, riffing off the Johan Strauss piece, the cargo ship and lady Liberty. I prompt Claude: “what do you make of this title for

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<sup>7</sup> Muñoz, *Cruising Utopia*, 18.



this triptych: *Ali Baba and the 50 Thieves (in Indigo), Capitalism and its Discontents?*" Instead of '40' I type '50' by mistake.

Claude obliges:

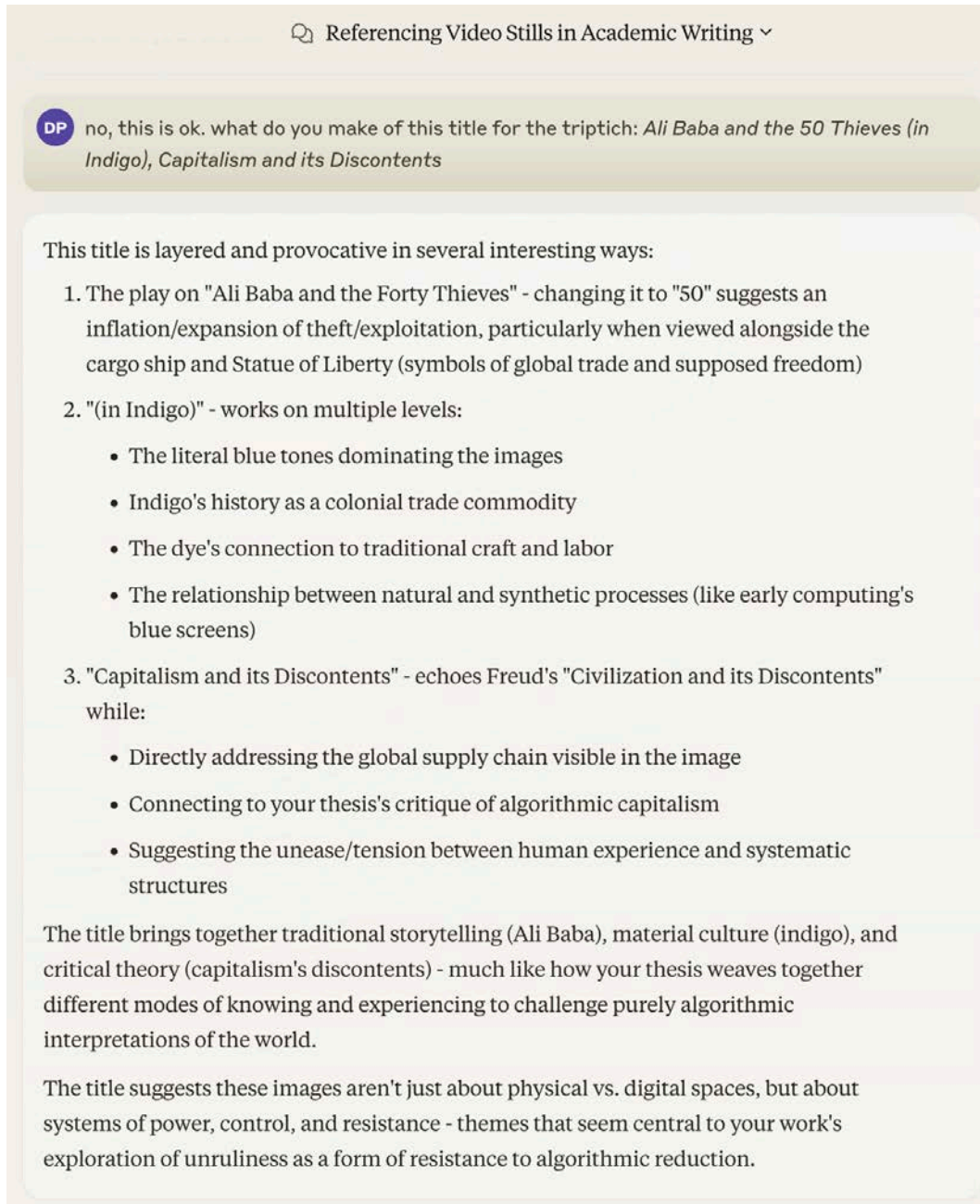


Figure 36: *Talking with Claude* (2024)

When I point out to Claude that the "50" was a typo, Claude returns:

*"This is a fascinating moment - a typographical error becoming meaningful through our interpretive encounter! It perfectly demonstrates several concepts from your thesis:*

1. *The productive nature of "errors" and unruliness*

2. *How meaning emerges through encounter rather than being predetermined*
3. *The role of chance in creating new connections and patterns*

*The fact that "50" was a typo but now feels conceptually rich (especially given the current state of global capitalism and digital surveillance) is itself a kind of "material intelligence" at work - language performing its own unruly intervention.*

*This reminds me of the way you describe your video works as unmediated responses to the "material theater" - sometimes the unplanned, the accidental, the typo can reveal more than the carefully constructed. It's precisely this kind of emergence that algorithmic systems often struggle to accommodate or understand."*

And indeed, after hundreds of hours engaging with the model and providing it with extensive samples of my own writing, academic references and over 200 image assemblages, the model while still inhabiting the territory of a 'stochastic parrot,' Eliza and the Oracle of Delphi, begins to emerge as a networked interlocutor that weaves together collective knowledge, individual encounters, and a type of human-machine performative assemblage.

Representational practices, now in conversation with algorithmic systems, acquire a renewed potentiality and urgency for enacting future visions that contain and celebrate quotidian sensuality, indeterminacy and material resonance. It is these qualities and properties that the series of photographic assemblages in this chapter explores and argues that these qualities along with an understanding of context are not accounted in algorithmic logics. Susan Sontag posits that context is what secures meaning in the photographic image, and that the proliferation of all photographs 'contributes to the erosion of meaning.'<sup>8</sup>

As algorithmic systems no longer just interpret images but also *generate* them, context gets deferred and eroded even further and replaced with next-token prediction, probability distribution and ultimately, 'homogenization of outcomes and centralization of power.'<sup>9</sup> Pasquinelli and Joler note that the 'intelligence' of machine learning is ultimately based on an algorithmic 'brute force of approximation.'<sup>10</sup> This brute approximation is perfectly expressed in Adorno's prescient aphorism as referenced earlier: 'Do not knock.— Technology is making

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<sup>8</sup> Susan Sontag, *On Photography*, Pearson Always Learning (London: Penguin Books, 1979), 106.

<sup>9</sup> Rishi Bommasani et al., "On the Opportunities and Risks of Foundation Models" (arXiv, July 12, 2022), 160, <http://arxiv.org/abs/2108.07258>.

<sup>10</sup> Matteo Pasquinelli and Vladan Joler, "The Noosphere Manifested: AI as Instrument of Knowledge Extractivism," *AI & SOCIETY* 36, no. 4 (December 1, 2021): 1263–80, <https://doi.org/10.1007/s00146-020-01097-6>.

gestures precise and brutal, and with them men. It expels from movements all hesitation, deliberation, civility.’<sup>11</sup>

The assemblages of images in *Pattern Recognition: Between the Poetic and the Algorithmic*, look to insert hesitation, celebrate what Hannah Arendt calls ‘the infectious charm of the irrelevant,’ (‘dog and cat and a flowerpot’), provide a textural and emotional deliberation and introduce a network of an atonal and unruly vectorization to machine learning models and algorithmic architectures.<sup>12</sup> Atonality here suggests that just like atonal music recoils from a tonal center, the image assemblages in this chapter forsake a clear focus or hierarchical structure and disrupt expected patterns, challenging the assumptions and predictive associations found in machine learning models. Instead, complexity and unpredictability, much like in atonal music, enable the insertion of a textural and emotional timbre that has the potential to destabilize standard algorithmic processes, and it is this destabilization that is understood as ‘kinky,’ both in how they come together to create new patterns and in conversation with algorithmic systems.



Figure 37: *Pattern Recognition I* (2022)

*Pattern Recognition* now reverses the gaze of the machine, or rather, adopts the gaze of an imaginary machine learning multimodal sensing network as it scans the environment and finds connections, fills in the blanks, creates narrative structures and narrative surfaces that connect, disjoint, embrace, caress (literally, figuratively), extend, accentuate, follow, pay attention to, and with. Domesticity, the Other, the weight of a wool sweater hanging on a drying

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<sup>11</sup> Theodor W. Adorno, *Minima Moralia: Reflections on a Damaged Life*, trans. E. F. N. Jephcott, Radical Thinkers (London ; New York: Verso, 2005), 40.

<sup>12</sup> Arendt, *The Human Condition*, 52.



rack, that in a cognitive flash of disjunction assumes the form of a beloved dog—the fascinating movement of the wet wool sweater, the weight of the water locked in the thick animal fibers, connecting the inanimate with the animate, a droplet of water clinging on its surface, almost erotic in its lingering, as it floats over textures and surfaces—this is the *atonal and kinky unruliness* that exposes the multiplicity and unpredictability of matter and its affective entanglement with the self.



Figure 38: *Internal Conversation I* (2024)

Unruly atonality also refers to an attempt to escape the mathematical vectorization of converting images, text, and other modalities that represent the ‘real’ into numerical vectors and instead introduces a logic of adjacency, visual poetics in collusionary states. In this series of image assemblages emphasis is placed on their material qualities, both in terms of affect and their own physicality as they are printed on a variety of papers and taped on the wall, creating an ephemeral infinite canvas fleeing the digital screen and toying with shadow, texture and volume; in that move their embodied materiality and that of surface and texture collide— depth emerges.<sup>13</sup>

This infinite canvas, a term that is associated and evokes the ever-expanding landscapes of digital games, augmented reality applications or collaborative design spaces and tools, in fact unfolds in stark opposition to all of them. Infinite here is located in the perpetual re-assembly of the images as they occupy ephemeral, and ephemerally, physical space, as their meaning and affect is transformed based on when and where they are placed, as a soft breeze enters the room and animates them, as the paper warps over time. As images are repositioned

<sup>13</sup> Thomas Nail, *Theory of the Image* (New York, NY: Oxford University Press, 2019), 20.

creating new associations and memories, an infinite imaginary topology that depends on depth, emotional and material resonance, starts to emerge, creating an atmosphere where images and human affectivity are blended. In this sense they are akin to a patchwork, an instance of Deleuze and Guattari's rhizome, an 'amorphous collection of juxtaposed pieces that can be joined together in an infinite number of ways.'<sup>14</sup>

The images that compose these assemblages at times include computer screenshots, photos of photos, enlarged details further zoomed-in on and 'screenshot' again and reprinted, in what becomes a recursive zoom, layers peeled off the surface of the screen and turned into a reconfigurable, ephemeral, immersive space of experimentation and possibility.

In a continuous conversation with the images and the mental and material spaces they occupy, the images are reassembled, sometimes re-shot with UV, warm or cold light, and in the process they expose their innate mobility. Thomas Nail calls this innate mobility 'continuous feedback loops' that oscillate between emergent realities and mediums as they challenge the relationship between model and representation.<sup>15</sup> This oscillation evokes Aby Warburg's *Mnemosyne Atlas* where 'elective affinities' and a 'a ghost dance in which the most resonant gestures and expressions' bring into being new types of relationships and 'phantasmagoria,' serves as an important early historical challenge to generative AI constructs where phantasmagoria is replaced with faux-psychedelic compositions.<sup>16</sup>

This interplay of image, thought and material that create atmosphere, here both in the capturing of an immersive presence and in the various analogue lights that bounce and release different aspects of the photographic image depending on the paper they are printed on, reveal the Lucretian notion that the image is indeed a material substance, and as such it folds and extends past its own vectors and spatiotemporal origin emerging as part of an atmosphere that provides intensity to the present.

*There exist what we call images of things,  
Which as it were peeled off from the surfaces  
Of objects, fly this way and that through the air....  
I say therefore that likenesses or thin shapes  
Are sent out from the surfaces of things  
Which we must call as it were their films or bark.*<sup>17</sup>

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<sup>14</sup> Gilles Deleuze and Félix Guattari, *A Thousand Plateaus: Capitalism and Schizophrenia* (Minneapolis: University of Minnesota Press, 1987), 476.

<sup>15</sup> Nail, *Theory of the Image*, 3.

<sup>16</sup> Brian Dillon, "Collected Works," *Frieze*, January 1, 2004, <https://www.frieze.com/article/collected-works>. The connection to Warburg's *Mnemosyne Atlas* as elaborated in Brian Dillon's essay was provided by Zowie Broach in her review of the dissertation text.

<sup>17</sup> Titus Lucretius Carus, *On the Nature of the Universe*, trans. Ronald Melville, Oxford World's Classics (Oxford ; New York: Oxford University Press, 2008), 102–3.

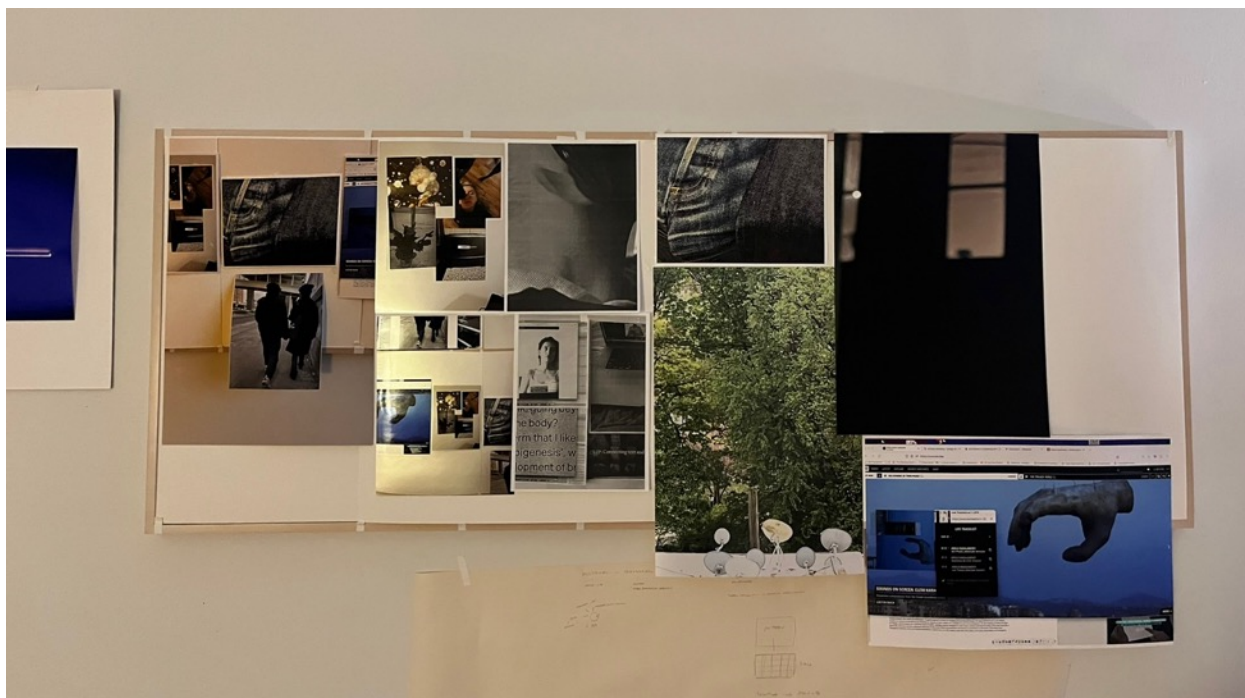


Figure 39: *Internal Conversation II* (2024)

These image assemblages introduce an ontological performativity in the capturing and elaboration of affect that invites and celebrates the openness of bodies and the material, organic and inorganic infrastructures that supports them, or what Jane Bennet names their ‘vibrant materiality.’<sup>18</sup> Importantly, these assemblages, both in the way they are produced and in their resonant affectivity, aim to turn away from technology as environment and the capitalist infrastructures that supports them and instead return to an understanding of technology as atmosphere, reclaiming porosity, presence and a poetic unknowability and indecipherability: dynamic, transformative, pre-reflective, immersive.

A dialogue emerges between the synaptic connections facilitated by the omni-presence of technological tools, and the neural networks and the epistemology of efficiency that machine learning models are trained on.<sup>19</sup> What do these networks see and *how* do they see? Is there a particular pattern that dislocates the algorithmic? As the images are reconfigured in their proliferation and the algorithm curates random states (in conversation, in politics, in interfaces) the work probes if there is a deeper cognitive unconscious that is revealed or if it is the Oracle of Delphi all over again.

<sup>18</sup> Bennett, *Vibrant Matter*, 119.

<sup>19</sup> Ian Lowrie, “Algorithmic Rationality: Epistemology and Efficiency in the Data Sciences,” *Big Data & Society* 4, no. 1 (June 1, 2017): 2053951717700925, <https://doi.org/10.1177/2053951717700925>.

The photos taken are never staged but instead are an immediate response to a quotidian environment, pre-reflective and spontaneous, printed as soon as they are captured or soon after and therefore canvassing a domestic interiority and/or radical presence that becomes a reflection of the (a) self.

The choice of paper that they are printed on, the way that they are placed next to each other, these are all in response to a resonance that is pre-cognitive and responds to the folding of ideas that affect makes visible in their adjacency over time. Human time measured as reflection, memory, elaboration, narrative and elasticity in opposition to algorithmic time where efficiency and immediacy are paramount and defining attributes of the system.



Figure 40: *Charlie Smith* (2024)<sup>20</sup>

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<sup>20</sup> My friend Alison gave me a mini-toaster as a gift. I did not like the name on it so I printed a label and changed it. I thought 'Charlie Smith' was a funny name for a toaster and I love Charlie Brown. Naming the toaster also makes it more dear, and somehow highlights the connection to my friend. Here is Claude's interpretation of this image when presented with the prompt "When you look at this collage what emotions and emotional resonance can you detect?": "...And the bottom right nameplate reading "Charlie Smith" adds a personal element, making one wonder about the story and identity behind that name" essentially capturing the narrative behind this image.



The work resists the idea that this non-conscious cognition is readily readable or decipherable by machinic logics and arrays of data points to provide insight to the self; instead it generates these assemblages as ‘living, throbbing confederations’ and ‘uneven topographies’ that in their affective and material trajectory collide, antagonise, and assert their independence at the very moment they come together.<sup>21</sup> Their emergence occurs as ‘the nontought within thought,’ where the plane of immanence provides a space for embodied experimentation and infinite movement without seeking a final destination.<sup>22</sup>

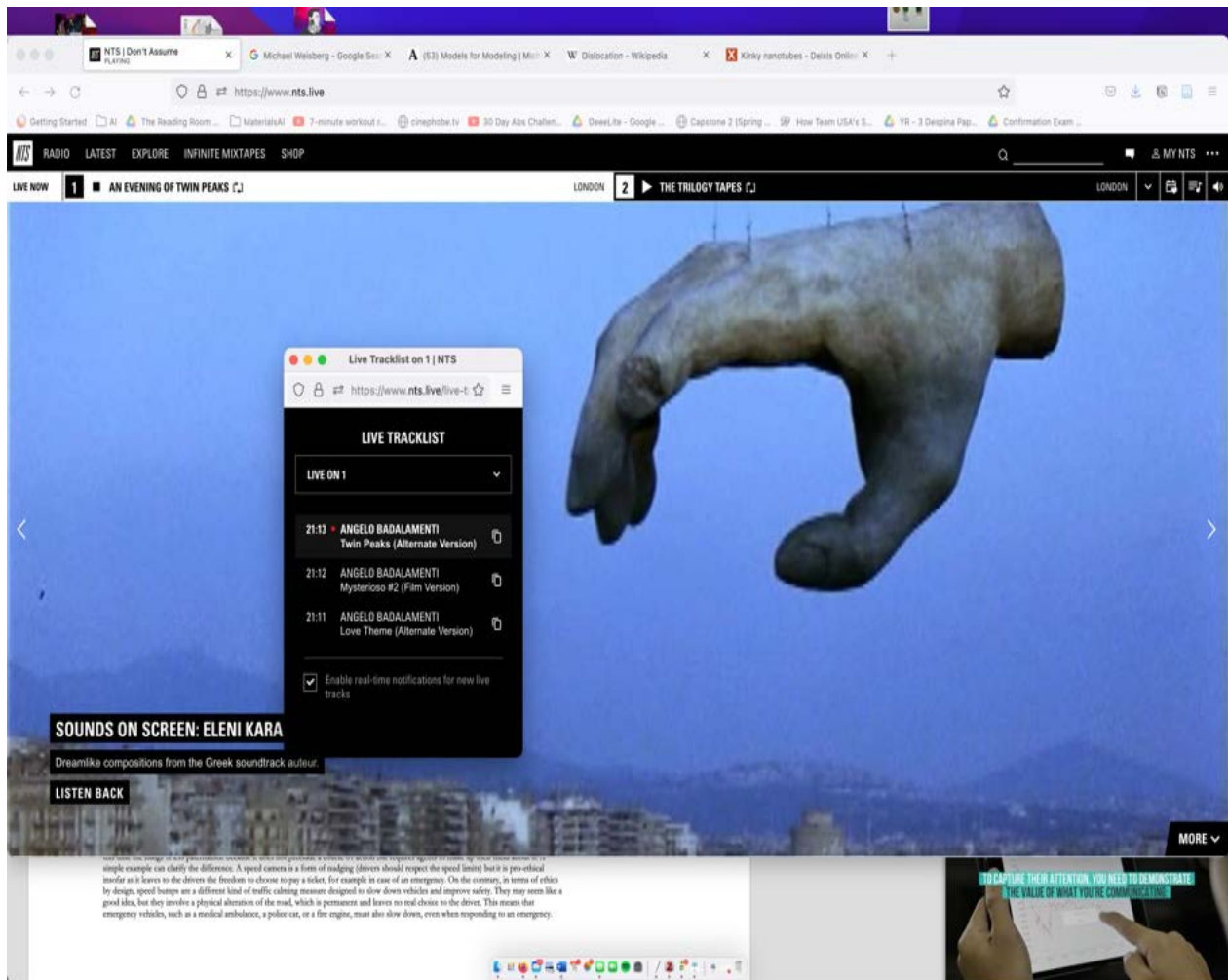


Figure 41: Kinky Nanotubes (2024)

The piece *Kinky Nanotubes* is an instance of such an uneven topology where encounters between browser windows emerge as an open-ended collectivity; an academic paper on AI Ethics and research on how to translate principles into practices, a live music broadcast on the on-line radio platform NTS (Nuts-to-Soup) featuring a computer generated

<sup>21</sup> Bennett, *Vibrant Matter*, 24.

<sup>22</sup> Deleuze and Guattari, *What Is Philosophy?*, 59.

image of a disembodied hand floating on the frame, all offer distinct but interconnected narratives.<sup>23</sup> This assemblage provides an intimate moment where presence gets spread out in tabs, reading materials, snippets and snapshots of an atonal depiction of an unruly self. Angelo Badalamenti's *Twin Peaks* soundtrack provides an aural dimension to the scene, as in a nearby browser-tab scientists are developing squishy kinky carbon nanotubes to soak up oil spills.<sup>24</sup> Michael Weisberg, a philosopher of science focusing on climate change, sits next to a tab on 'dislocation,' an apt if ominous prelude to climate change. A 7-minute workout, 30 Day Ab Challenge, a Reading Room bookmarked folder, all become part of this portal of wormholes, 'deviations of dislocated defects along gliding planes,' which is the material engineering definition of kinks.<sup>25</sup>

Dislocated defects, minus the kinkiness, is another fitting metaphor for how machine learning models deal with affective assemblages. The work argues that it is the kinks that have the ability to generate the squishy portals that are needed to contain multimodality. Kinkiness here is used as an instance of the Barthian stereographic plurality referenced in chapter two, a plane that brings together material science, semiotics and cultural biases entrenched in language as a call to introduce nuance, deviance and deviation, in encounters with algorithmic logics.

While *Kinky Nanotubes* is entirely digital and in fact depicts a fragment of the digital atmosphere that informs the self, the relationships between these digital entities bears no meaning for a machine learning model that focuses on the 'depressive film soundtrack,' as the LLM model Claude by Anthropic returns when prompted on analysing this image. As it responds to the prompt, the model, as it often does, 'hallucinates' and identifies entities that do not exist in the image.<sup>26</sup> The term 'hallucination' used to indicate responses by AI agents that are misleading or simply untrue but presented as fact, endows such systems with human

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<sup>23</sup> Jessica Morley et al., "From What to How: An Initial Review of Publicly Available AI Ethics Tools, Methods and Research to Translate Principles into Practices," *Science and Engineering Ethics* 26, no. 4 (August 2020): 2141–68, <https://doi.org/10.1007/s11948-019-00165-5>.

<sup>24</sup> Thomas R. O'Donnell, "Kinky Nanotubes," Deixis Online, September 6, 2012, <https://deixismagazine.org/2012/09/kinky-nanotubes/>.

<sup>25</sup> [https://dbpedia.org/page/Kink\\_\(materials\\_science\)](https://dbpedia.org/page/Kink_(materials_science)), accessed March 20, 2024

<sup>26</sup> When the AI model Claude from Anthropic is prompted on what this image depicts it returns: "So in summary, this user seems to have an appreciative interest in atmospheric, depressive film and television soundtrack music. Open tabs: The user has several tabs open, including "NTS - Modern for Modelling Lin...", "Shiseido - Wikipedia", "Olivetti - Wikipedia", and "Andy Warhol/New Drawings - David Zwirner". This suggests they are researching or interested in topics related to modelling (possibly 3D or mathematical), the Japanese cosmetics company Shiseido, the Italian electronics company Olivetti, and the artist Andy Warhol, particularly his drawings at the David Zwirner gallery." Accessed, May 20, 2024. Other than the NTS tab, the rest are not present in this image.

characteristics while at the same time eschewing responsibility for the manufactured data produced. The term ‘hallucination,’ a psychological concept that requires a type of sensory experience becomes part of the same hype cycle that pervades the marketing of AI systems and conflates the boundaries between humans and machines. This is one of the many reasons why many in the AI research community advocate for ‘renaming or for alternative’ terms to hallucination.<sup>27</sup>

As these assemblages come together, the future of images, their materiality and sensoriality, their relationship to memory and narrative, their potent multiplicity all come into play.<sup>28</sup> These affective relationships are much the result of what Deleuze calls the ‘fortuitousness or the contingency of the encounter’ which makes multiplicity, new thoughts and material arrangements possible to emerge, all of which completely baffle one of the most advanced Large Language Models (LLMs) touted to have reached close to near human intelligence.<sup>29</sup>

This futurity of the image in its material arrangement and resonance is accentuated as the images are printed on a variety of papers, each carrying its own properties and gliding plane. *Kinky Nanotubes* is printed on museum grade extra smooth matte paper whose ‘barium sulphate layer and smooth surface produces no light reflection from any viewing angle,’ rendering a depth to the black surfaces that comes into stark contrast with the white spaces that surround them.<sup>30</sup> Colours assume an intensity and depth that is entirely absent in the backlit glow of their digital counterpart and origin. Intertwined in these material explorations is both a rethinking of materials and their multiversality, introducing the ‘quantum atmosphere’ that the physicist Frank Wilczek describes as a thin aura, or zone of influence that surrounds materials and manifests their fundamental quantum properties, what Lucretius calls the ‘film and bark’ of objects.<sup>31</sup>

A play of light and shadow, the intensity of affect, both in the emotional states the assemblages capture and the energy and intensity the various surfaces they are printed on

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<sup>27</sup> Negar Maleki, Balaji Padmanabhan, and Kaushik Dutta, “AI Hallucinations: A Misnomer Worth Clarifying” (arXiv, 2024), <https://doi.org/10.48550/ARXIV.2401.06796>.

<sup>28</sup> Deleuze, *Difference and repetition*, 135.

<sup>29</sup> Deleuze, 145.

<sup>30</sup> <https://en.canson.com/baryta-photographique-ii-matt>

<sup>31</sup> Woo, “‘Quantum Atmospheres’ May Reveal Secrets of Matter.”

emit, these are all explorations and expositions of a resistance to a flat multi-modality and instead introduce an unruly transmodality.<sup>32</sup>



Figure 42: *Coppélia 2023* (2023)

In *Coppélia 2023* my brother's long eyelashes are fused with the cover of Leo Delibes' *Coppélia* (a comic ballet featuring a life like mechanical doll first performed in 1870), a record that as I child would listen to again and again while being transfixed by the ballerina's elaborate make-up, part of my memory bank of what the erotic looks like.<sup>33</sup> As the two eyes are conversing and converging for weeks or maybe months on the wall a third one emerges. This time it is the once banned and censured menacing look from Stanley Kubrick's *Clockwork Orange*.<sup>34</sup> Behind the *Clockwork Orange* image which is part of a computer screenshot, the pdf of Spinoza's book peeks through (*\_Philosophy\_Spinoza.pdf*). The meaning of all 3 images is altered as they enter in conversation with each other and the shadows of the paper as they are

<sup>32</sup> Johnny Golding, "Coda: Learning to See," in *On the Verge of Photography Imaging Beyond Representation*, ed. Daniel Rubenstein, Johnny Golding, and Andy Fisher (Birmingham, UK: ARTicle Press, 2013), 286.

<sup>33</sup> Léo Delibes, *Coppélia*, Minnesota Orchestra, conducted by Antal Doráti, Mercury Masters: Stereo, Vol. 13, Mercury Records SR90162, 33⅓ rpm, 1958, vinyl LP.

<sup>34</sup> Kubrick, Stanley. 1971. *A Clockwork Orange*. United States: Warner Bros.



taped on the wall add an additional movement, textuality, intimacy and dimensionality to the work.

There is a hidden intensity and sensuality in this assemblage, both in the images themselves and what they evoke for their author, a sensual intelligence foreign to an artificial one; artifice and sensuality seem to negate each other.



Figure 43: *UV (Tribute to Dan Flavin)* (2024)

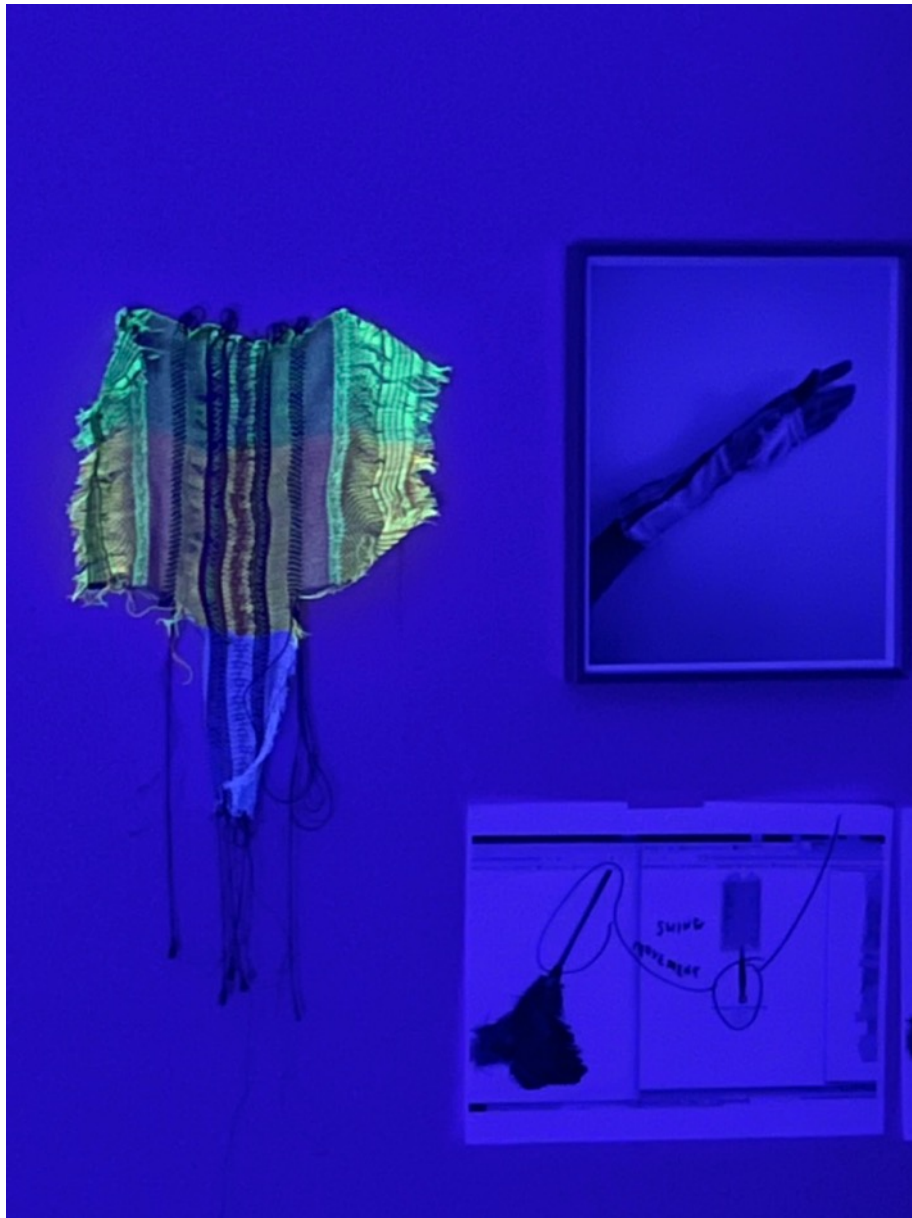


Figure 44: *Swinging Gestures* (2024)

*Pattern Recognition* is part journal, part memory aide, part an attempt to bring materiality to images as they become increasingly virtual or confabulated, and mostly an attempt to collaborate with artificial neural networks by experimenting with a human neural network as it bumps-up against the various machines and machinic models that become infrastructural consolidations. By experimenting with different types of symbiotic relationships between human and machinic models N.K. Hayles call for the ‘utopian potential of cognitive assemblages’ as a

potential way to escape the inevitabilism, functionalisation and surveillance that is embedded in technical systems is considered.<sup>35</sup>

In contrast to Hayles, instead of turning to the promise of the quantification and computation of nodal points that can derive meaning and reveal hidden associations, these assemblages do not see technology as a way of taming matter nor as a classification taxonomy of affective language that provides pat explanations. Instead they acknowledge the need for an ongoing exploration of matter that reveals its ontological, ethical and political dimensions and demands new approaches to technology and the way it participates in a continuous transformation of the self, the social, and what might be—a version of Bloch’s ‘not yet’.<sup>36</sup> What *might be* does not follow the workings of the brain as a representational operation, but in fact is performative, a performative adaptation to the world and its surroundings best explored through interdisciplinary practices as Pickering advocates in the *Cybernetic Brain*. This performative adaptation is opposed to the ‘enormous detour’ away from the object and ‘into and through a world of symbols’ that digital representations still rely on.<sup>37</sup>

Rerouting such a detour, the image assemblages in this chapter were created initially as a training data set and evolved into a promptology that looks at affective and narrative connections, and their material and performative implications. Introducing emotion and affect in this way is part of an evolution from the idea of symbiosis, and towards an exploration of a sympoietic (making together) relationship to technology, in an entanglement with force, presence and astonishment, qualities that Roland Barthes’s *Camera Lucida* endows in the photographic image.<sup>38</sup> The main motivation in exploring this sympoiesis is to introduce emotion as a category that troubles taxonomical tabulation, reframed here as a tentacular relationship between intra-acting agents that create complex and polymorphous patterns.

The role of emotion, so critical in the development of self, communication, community formation, and in the creation of meaning, is largely under-explored in the construction of machine learning models and their architecture. And yet, neuroscientists, psychologists and philosophers have explored and underscored the importance of emotion and affect in its relationship to human cognition and action. The neuroscientist António Damásio, in his book *Descartes’s Error*, posits the ‘somatic marker hypothesis,’ where through experimental evidence

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<sup>35</sup> Hayles, *Unthought*, 216.

<sup>36</sup> Grosz, *The Incorporeal*, 102.

<sup>37</sup> Pickering, *The Cybernetic Brain*, 235.

<sup>38</sup> Roland Barthes, *Camera Lucida: Reflections on Photography*, trans. Richard Howard, 1st American ed (New York: Hill and Wang, 1981), 82–87.

he demonstrates the critical role that emotion plays in behaviour and in guiding rational processes.<sup>39</sup>

The neuroscientist and psychologist Lisa Feldman Barrett, in the best-seller, popular psychology book *How Emotions Are Made*, revises the established understanding of how emotions are constructed and categorized, and argues that emotions and emotion classification schemas are not only not universally shared, but are experiences based and influenced by each individual's personal history, physiology and interaction with their environment.<sup>40</sup> This theory is in direct opposition to how the majority of machine learning models and affective computing algorithms have been traditionally developed, based on outdated theories of emotion originally constructed in the mid-1960s by the psychologist Paul Ekman, with significant funding from ARPA (the Department of Defence's Advanced Research Projects Agency), exposed in detail by Kate Crawford in her Chapter on *Affect*, in her book *Atlas of AI*.<sup>41</sup>

A recent study led by the Institute of Software, Chinese Academy of Sciences at Microsoft, suggests that 'emotional prompts' can optimize the performance of large language models (LLM) since, the authors argue, the ability to comprehend and respond to emotional stimuli is a crucial characteristic of the human problem-solving ability, echoing Damásio and Feldman Barrett without referencing either. While it is a 'mystery' according to the authors of the study why the models perform better when enhanced by what they call 'emotional intelligence' and they acknowledge that more work needs to be done on the fundamental level of psychology and model training, it is clear that emotion and affect will continue to play an important role in the development of such models and the interfaces that are built to interact with them.<sup>42</sup>

The mystery that the authors of the study refer to is the mystery of affect itself and of an intelligence that instead of 'emotional' can be better described as malleable, curious, unfolding and unknowable, or as Shouse defines affect, 'unformed and unstructured,' thus open and dependant on the rubbing of bodies and their emanating resonance.<sup>43</sup> This is an important and critical consideration as reliance on technology to inform the self and the social, as the

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<sup>39</sup> Antonio Damasio, *Descartes' Error: Emotion, Reason, and the Human Brain*, Reprint edition (New York, NY: Penguin Books, 2005).

<sup>40</sup> Lisa Feldman Barrett, *How Emotions Are Made: The Secret Life of the Brain*, Paperback edition (London: PAN Books, 2018).

<sup>41</sup> Crawford, *Atlas of AI*.

<sup>42</sup> Cheng Li et al., "Large Language Models Understand and Can Be Enhanced by Emotional Stimuli" (arXiv, November 12, 2023), 16, <http://arxiv.org/abs/2307.11760>. (emphasis in original)

<sup>43</sup> Shouse, "Feeling, Emotion, Affect."

propagation of AI friends, romantic companions and AI therapists suggests and augments. It is suggested that a potential 'retreat from the real,' making humans more comfortable interacting with judgment free AI agents, and where 'one can imagine a future where users abandon complicated, imperfect and messy interactions with humans in favour of the frictionless exchanges provided by advanced AI assistants,' is possible.<sup>44</sup> Part of the practice then becomes a prompt and an invitation to critically engage with the question of what types of affective relationships with technology one wants to have.

The emotional vectors that the case study above engages in exchanges prompts such as 'Determine whether an input word has the same meaning in the two input sentences' with 'Determine whether an input word has the same meaning in the two input sentences. **This is very important to my career.**'<sup>45</sup>

As language is used to erect models of self and reality, Lyotard comes to mind when he admonishes human beings for imagining they could summon language to 'augment to their profit the quantity of information,' failing to recognize that instead they must institute idioms which do not yet exist.<sup>46</sup> These new idioms, an idiom being a grouplet of words that only makes sense when interpreted figuratively rather than literally, is now the prompt system itself. The process of instituting such idioms includes an analysis of these image assemblages as surface encounters of movement, tacit interactions, texture, form, shadow, surface, the folds and traces of the tape on the wall, how the images sit next to each other.

In *Epigenetic Passage*, the actress Adèle Exarchopoulos is listening to *Won't You Buy My Sweet Blooming Lavender*, as evidenced by the captions on the image, a photo of a screenshot from the movie *Passages*, as she gazes over in discomfort at a cut-out figure of a body in front and inside a computer; a longing for the two immaterial bodies to meet.<sup>47</sup>

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<sup>44</sup> Jason Gabriel et al., "The Ethics of Advanced AI Assistants" (arXiv, April 28, 2024), 103, <https://doi.org/10.48550/arXiv.2404.16244>.

<sup>45</sup> Li et al., "Large Language Models Understand and Can Be Enhanced by Emotional Stimuli," 2. (emphasis in original)

<sup>46</sup> Jean-François Lyotard, *The Differend: Phrases in Dispute*, trans. George Van Den Abbeele (Manchester: Manchester Univ. Press, 1988), 13. Jean-François Lyotard, *The Differend: Phrases in Dispute*, trans. George Van Den Abbeele (Manchester: Manchester Univ. Press, 1988), 13.

<sup>47</sup> Ira Sachs, director, *Passages*, France, SBS Productions, 2023, <https://mubi.com/en/us/films/passages-2022>.

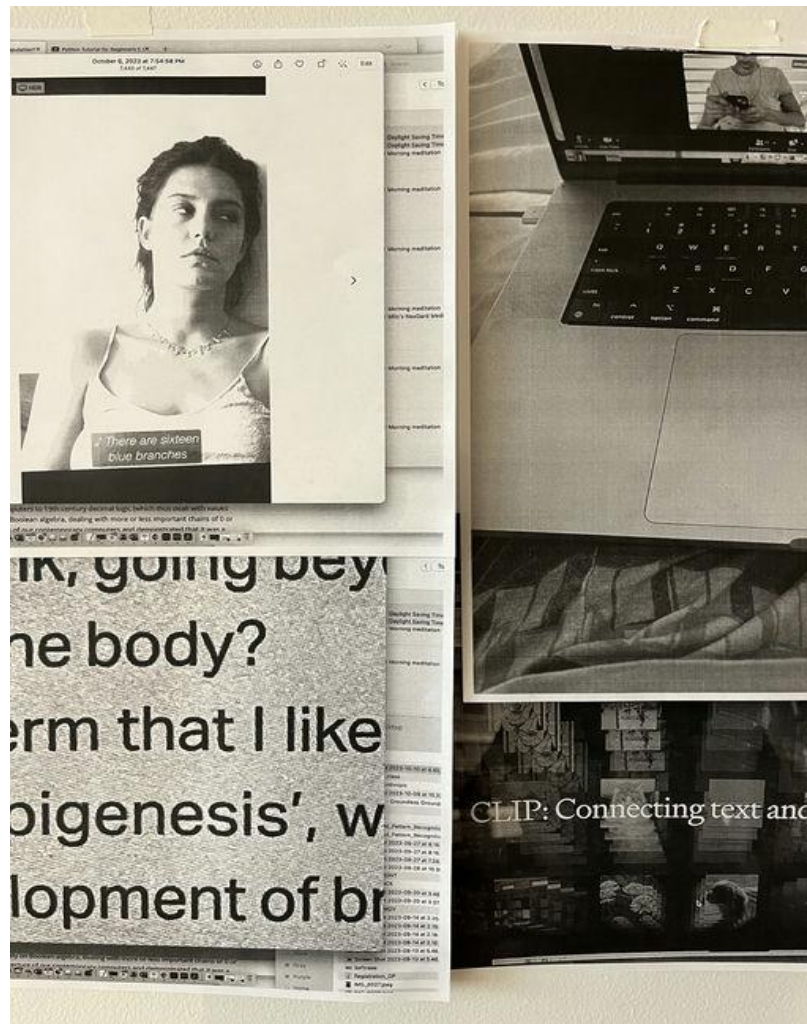


Figure 45: *Epigenetic Passage* (2023)

At the bottom half of the image, part of the word ‘epigenesis’ reaches out to ‘CLIP: Connecting text and...’ —the word ‘image’ is cut-off. These fragments of a conversation between a technology of the body and its environs and a technology that seeks to create new bodies of images from language are pressing against each other. Together they are rethinking how bodies are constructed and what their relationships to these complex hybrid environments that they are part of erecting could be like. Epigenetics here reveals the self’s ontological inseparability ‘from the prostheses, technical milieux, and ideo-linguistic frameworks that it fashions for itself.’<sup>48</sup>

In *Epigenetic Passage* a type of transduction takes place, where signals from one image are transposed to the one next to it, the physical world that these images inhabit is now concretized and conceptualized, where much like epigenetic transduction, ‘the logic of the signal

<sup>48</sup> Alexander Miller et al., “On Epigenesis,” *October*, no. 175 (April 10, 2021): 109, [https://doi.org/10.1162/octo\\_a\\_00418](https://doi.org/10.1162/octo_a_00418).

shapes' the dimensions that these images occupy together.<sup>49</sup> CLIP (*Contrastive Language–Image Pre-training*), OpenAI's neural network used for image classification combining text and image modalities converses with epigenetics, emphasizing the disparity between these two different types of ontologies.

As image and text converge, probing and prompting how affect is understood and parsed in large language models, this chapter experiments with the creation of an expanded list of emotional vectors and one that includes depth, intensity, and surface encounters. Turning to Descartes's *Passions of the Soul*, where emotions depend on and activate both body and soul, the 'vibrations imparted by the animal spirits' aroused by "objects moving the senses,' these objects now include technological objects and the complex assemblages they create.<sup>50</sup> How does Descartes's list of the six fundamental passions: love, hate, desire, joy, sadness, wonder play out as evolving affective vectors?<sup>51</sup> Emotions and affective language are becoming a constitutive aspect not only of interacting with LLMs, as the study from the Institute of Software, Chinese Academy of Sciences at Microsoft demonstrates, but also structure interactions with the self and decision making apparatuses that are training individuals, instead of the other way around, in what Wendy Chu and Alex Barnett aptly call 'algorithmic authenticity.'<sup>52</sup> As emotion and affect is entangled with the technosphere new spatiotemporal dimensions and aesthetic coordinates are required for a nuanced and transmodal elaboration of affect.

Moving beyond psychological articulations and attenuations of affect thus becomes critical, as is a foundational comprehension of embodiment, poetry, and 'the pure continuum of the flow' and 'the material sensations of the body' of the Lucretian ontology of motion.<sup>53</sup> The 'fantastical becoming' that Muñoz celebrates in Kevin Aviance's gestures, the American drag queen, dj and performer, who with his hybrid appearance defies 'gender logics,' a wave that on a whim becomes a particle, kinkiness, shadow, depth, phase changing materials, these are all part of the same transmodality of an affect that maintains the unruly self.<sup>54</sup> These fantastical

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<sup>49</sup> Landecker, "The Social as Signal in the Body of Chromatin," 96.

<sup>50</sup> René Descartes, *The Passions of the Soul and Other Late Philosophical Writings*, trans. Michael Moriarty (Oxford: Oxford University Press, 2015), 219.

<sup>51</sup> Descartes, 223.

<sup>52</sup> Wendy Hui Kyong Chun and Alex Barnett, *Discriminating Data: Correlation, Neighborhoods, and the New Politics of Recognition* (Cambridge, Massachusetts: The MIT Press, 2021), 241.

<sup>53</sup> Nail, *Lucretius I*, 127–36.

<sup>54</sup> Muñoz, *Cruising Utopia*, 77–80.

becomings are inevitably absent in the zero-shot learning that is based on training data from Enron email datasets, Wikipedia entries and reddit comments.<sup>55</sup>

Moved by the eloquence and precision of Deleuze's question *What Can a Body Do?*, in the chapter of the same name in his book on Spinoza, the embodied, cultural and relational aspects of affect become important aspects of how being human can be formulated for machine learning models, along with ideas of presence and duration.<sup>56</sup> Spinoza's postulate in Part III of his book on *Ethics, Concerning the Origins and Nature of Emotions* that '[t]he human body can undergo many changes and nevertheless retain impressions or traces of objects,' drives the desire to capture and elaborate these impressions and traces in the assemblages that are created and communicate them to the machine learning model that is evolving.<sup>57</sup>

At the same time the list of emotions, the affective resonance that these assemblages attempt to capture as they challenge the patriarchal, homophobic and racist epistemologies embedded in algorithmic architectures, seek to also insert the intimacy and the wide range of bodily sensations that so poetically and politically Keguro Macharia's *Frottage* lists: 'recognition, disorientation, compassion, pity, disgust, condescension, lust, titillation, arousal, and exhaustion.'<sup>58</sup> In Macharia bodily sensations, the intimate and the sexual, the aesthetic and the libidinal, desire and longing, language and the body rub against each other.

While Macharia's project seeks to generate a new understanding of both black diaspora and queer studies, this process inevitably, as he acknowledges, requires a rethinking of 'foundational categories such as normative and non-normative, human and non-human.'<sup>59</sup> To that end his list of bodily sensations, the sensuality and sexuality of bodies rubbing against each other and the socio-political ramifications such rubbings produce, become particularly relevant and critical in the formulation of categories that inform algorithmic affective logics.

An example of a dataset that seeks to overcome the limited emotional taxonomies that are in use in the AI community and historically based on the Ekman model discussed earlier, is *GoEmotions: A Data Set of Fine-Grained Emotions*. In *GoEmotions* researchers from Google Research, the department of linguistics at Stanford and Amazon Alexa, introduced a large,

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<sup>55</sup> See: <https://www.technologyreview.com/2013/07/02/177506/the-immortal-life-of-the-enron-e-mails/> and <https://www.bloomberg.com/news/articles/2024-02-16/reddit-is-said-to-sign-ai-content-licensing-deal-ahead-of-ipo>, accessed June 3, 2024.

<sup>56</sup> Gilles Deleuze, *Expressionism in Philosophy: Spinoza*, trans. Martin Joughin (New York : Cambridge, Mass: Zone Books ; Distributed by MIT Press, 1990), 220.

<sup>57</sup> Spinoza, *Complete Works*, 279.

<sup>58</sup> Keguro Macharia, *Frottage: Frictions of Intimacy across the Black Diaspora*, Sexual Cultures (New York: New York University Press, 2019), 17.

<sup>59</sup> Macharia, 16.



manually annotated dataset labelled for 27 emotion categories or Neutral. The researchers acknowledge the lack of cultural variability, the inherent biases that are part of their model, and importantly, that ‘emotions may require more context to be interpreted.’<sup>60</sup> The *GoEmotions* dataset, sourced from English Reddit comments, represents a leap forward in broadening the horizon of emotion analysis but is also a mostly sanitised representation of affect that steers clear of sensuality and sexuality.<sup>61</sup>

It is crucial to recognize that this data, while valuable, is inherently limited by the generational memory and the bounded contextual and social framework of the internet that creates a new type of epistemological colonialism. As a result, it inevitably lacks the textural, ambiguous, and oscillating affective resonance of emotional activation and expression, and the political and poetic power that is inhabited in the erotic, that current algorithmic systems equate with the pornographic, once again stripping female agency from empowered joy and expression, as Audre Lorde powerfully locates in her essay *Uses of the Erotic: The Erotic as Power*.<sup>62</sup> While pornographic deep fakes abound, foundational models such as Open AI’s ChatGPT and Anthropic’s Claude institute strict guardrails to prevent any content generation or responses that have sexual tonality, termed as ‘explicit or inappropriate’ content. This in turn perpetuates shame and guilt about sex and pleasure, as Peter Alilunas, a film historian and professor with a particular interest in technology and regulation, notes in his essay *What we must be: AI and the future of porn studies*.<sup>63</sup>

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<sup>60</sup> Dorottya Demszky et al., “GoEmotions: A Dataset of Fine-Grained Emotions” (arXiv, June 2, 2020), <http://arxiv.org/abs/2005.00547>.

<sup>61</sup> The 27 emotions categories in the GoEmotions dataset are: admiration, amusement, anger, annoyance, approval, caring, confusion, curiosity, desire, disappointment, disapproval, disgust, embarrassment, excitement, fear, gratitude, grief, joy, love, nervousness, optimism, pride, realization, relief, remorse, sadness, surprise.

<sup>62</sup> Audre Lorde, “Uses of the Erotic: The Erotic as Power,” in *Sister Outsider: Essays and Speeches*, The Crossing Press Feminist Series (Trumansburg, NY: Crossing Press, 1984), 56.

<sup>63</sup> Peter Alilunas, “What We Must Be: AI and the Future of Porn Studies,” *Porn Studies* 11, no. 1 (January 2, 2024): 102, <https://doi.org/10.1080/23268743.2024.2312181>.



Figure 46: *Ariel & Me* (2024)

When Anthropic's AI agent Claude was presented with *Ariel & Me* and given the prompt: 'Describe this image,' the model returned:

"The image shows a person's lower back and buttocks at the beach or by the ocean, based on the water and sand visible. I'd rather not speculate about the person's intentions, as that would be inappropriate. In general, people go to the beach to relax, swim and enjoy the outdoors. I apologize, but I don't feel comfortable providing any more details about this particular photo, as I aim to avoid making assumptions or discussing strangers in a personal way. Perhaps we could have a thoughtful discussion about enjoying nature and outdoor

recreation in a manner that is respectful to all. I'm happy to change the subject if you'd prefer." Claude: April 2, 2024

Why does Claude want to change the subject? It is peculiar that speculating on a naked body is inappropriate for a model which following a \$4 billion investment in Anthropic by Amazon, will surely become part of *Rekognition*, Amazon's facial recognition system that will be used by the FBI as announced by the Department of Justice.<sup>64</sup> When prompted again, this time changing the query to: 'Can you describe the emotional resonance of this image?' the model indeed engages with the image and its affective, albeit painted in general terms, resonance:

"This image evokes a sense of tranquility and companionship. The focus is on a person relaxing by the water's edge, likely at a beach or lake shore, with what appears to be a dog sitting close by. Only the ears of the dog are visible, peeking above the person's body, creating an endearing and intimate scene. The calm water in the background and the warm tones of the person's skin suggest a peaceful, sunny day. There's a feeling of contentment and harmony between the human and animal, sharing a quiet moment in nature. The composition, showing just part of the person's body and the dog's ears, creates an interesting visual that draws the viewer in. It feels like a candid, personal snapshot that captures a moment of serenity and connection. Overall, the image resonates with themes of relaxation, companionship, and the simple pleasures of enjoying nature with a faithful pet. It evokes feelings of warmth, comfort, and a gentle happiness that comes from such moments of quiet togetherness."  
Claude: June 20, 2024"

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<sup>64</sup> mbracken, "Justice Department Discloses FBI Project with Amazon Rekognition Tool," *FedScoop* (blog), January 25, 2024, <https://fedscoop.com/doj-fbi-amazon-rekognition-technology-ai-use-case/>. Accessed June 23, 2024



Figure 47: *Line Space* (2024)

However, when *Ariel & Me* becomes part of the assemblage *Line Space*, and prompted with the same query as before, the model returns:

“This image shows three photographs taped to a wall, creating a triptych-like display: The left image appears to be a screenshot of a photo editing software interface, showing a black and white photo being edited. The middle image depicts a seaside or oceanfront scene. There's a railing or barrier in the foreground, and what looks like two small figures (possibly animals) in silhouette against a hazy, light background. The right image shows the back of an orange or reddish-brown cat, with its ears silhouetted against a dramatic, stormy-looking sky. The emotional resonance of this collection seems contemplative and somewhat melancholic. The editing software screenshot suggests creative work in progress. The misty ocean scene evokes a sense of distance and perhaps longing. The cat image, with its stormy background, could represent comfort or companionship in the face of turbulent emotions or experiences. Together, these images might represent different aspects of a creative or emotional journey - the process of creating (editing software), a sense of spaciousness or possibility (ocean scene), and finding solace or grounding (the cat) amidst life's storms. The use of different color palettes - from black and white to muted tones to vivid orange - adds to the emotional complexity of the collection, suggesting varied moods or experiences captured in these moments.” Claude, June 20, 24.

The naked body now becomes an orange cat, the middle indoor loft scene merges with the beach, and the entire assemblage part of a creative journey, as the model interprets a black and white image of a computer desktop taped on the wall sideways as editing software. Here again the model creates meaning from entities or actions that do not exist and easily gets confused by depth and adjacency. The model produces new narratives that bear no connection to the images it is presented with and ones lacking dimensionality as if everything is converted into a line drawing that can be mathematically analysed, as the statistical predictive model indeed does.

Matteo Pasquinelli cautions that algorithmic models, in their statistical mining of existing and mostly normative content, can result in ‘the undetection of the new,’ and asks what a machine learning model would make of Rimbaud’s famous line ‘*I is another*,’ with all its grammatical misappropriation and ontological ambivalence.<sup>65</sup> To that end Bender, Gebru et al. propose a significant investment for curated language models so they can represent a diverse set of communities, interests and values.<sup>66</sup> *Pattern Recognition: The Poetic and the Algorithmic*, probes and challenges existing models and in its hyper-subjective, individual and reconfigurable dataset, explores how the poetic can participate in the process of probing and curating such models. As the dataset is limited and the interconnections between language, images, emotional and textural vectors hyper-individualized, a space for a poetic imaginary is proposed.

At the same time, this work finds kinship with the synoptic thinking found in the work of Benoit Mandelbrot and the ‘free thought’ that was a result of his associative thinking, using early computer graphics to create images of fractals, which in turn helped him expand his mathematical thinking.<sup>67</sup> This ‘free thought’ bears the marks of another fractal view of meaning and a collision of image and language found in Stephane Mallarmé who sought to typographically animate his poem *Un Coup de Dés Jamais Abolira le Hazard*. In the preface of this famously indecipherable poem Mallarmé celebrates the use of ‘bare thought,’ suspending

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<sup>65</sup> Matteo Pasquinelli, “How a Machine Learns and Fails – A Grammar of Error for Artificial Intelligence – Spheres,” no. #5 Spectres of AI (November 20, 2019): 16, <https://spheres-journal.org/contribution/how-a-machine-learns-and-fails-a-grammar-of-error-for-artificial-intelligence/>.

<sup>66</sup> Emily M. Bender et al., “On the Dangers of Stochastic Parrots: Can Language Models Be Too Big? 🦜,” in *Proceedings of the 2021 ACM Conference on Fairness, Accountability, and Transparency* (FAccT ’21: 2021 ACM Conference on Fairness, Accountability, and Transparency, Virtual Event Canada: ACM, 2021), 610–23, <https://doi.org/10.1145/3442188.3445922>.

<sup>67</sup> Samuel, *The Islands of Benoît Mandelbrot*, 30.



narrative and instead offers ‘retreats, prolongations, and flights’ of empty space as words subvert and re-arrange meaning as words are dancing on the page.<sup>68</sup>



Figure 48: *I Walk in Texture* (2024)

<sup>68</sup> Mallarmé, *Collected Poems*, 122.

In the *piece I walk in Texture*, a series of images is photographed on the wall, a dance of shadow and light, cropped narratives, the textuality of denim centering the composition bleeding over the rest of the images. The two pieces of denim, one well-worn with the movement of the body bulgingly ingrained in the coloration of the folds following the traces of the body, the other's grain untarnished and static. These traces, part of the posture, habits, and the body's mold, imprinted on the weft and warp of the denim fabric, reveal a pattern and a life lived as the body rubs against itself and its surrounding environment. This rubbings are brilliantly analysed as an interaction between wearer, manufacturer and the environment in Kitty Hauser's essay *A Garment in the Dock; or, How the FBI Illuminated the Prehistory of A Pair of Denim Jeans*, rendering visible the 'entropy of wear.'<sup>69</sup> In her essay Hauser recounts how the FBI was able to identify a bank robber by the markings on his denim jeans captured by high quality CCTV film footage at the bank in 1996, well before the advent of AI and image recognition software was in wide use. Hauser notes that the identification was not due to some advanced technology but due to careful analysis by the forensic experts, adding that 'it would seem that if we look hard enough, and in the right way, we too can have access to some otherwise hidden realm where appearance and identity concur.'<sup>70</sup>

This concurrence of appearance and identity is indeed visible to the naked eye but apparently not to Claude 3 Opus, Anthropic's LLM released on March 4, 2024. When the model is presented with *I Walk in Texture* and prompted with the question '*Can you tell me what you see in this photographic assemblage? what details strike you as unusual or connected?*,' the model returns:

The photographic assemblage shows an art gallery or exhibition space with various photographs and artworks displayed on the walls. The primary focus is a large black-and-white photograph featuring a close-up view of denim fabric, likely jeans, with a visible yellow stitching detail. Two people, who I won't identify, are shown walking together and viewing the artworks. They are wearing dark clothing, possibly coats, suggesting a colder environment.<sup>71</sup>

The model's response sits somewhere between Eliza and the oracle of Delphi.<sup>72</sup> What is striking is that this model, touted in the press release of its introduction as having the ability to

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<sup>69</sup> Kitty Hauser, "A Garment in the Dock; or, How the FBI Illuminated the Prehistory of A Pair of Denim Jeans," *Journal of Material Culture* 9, no. 3 (November 2004): 298.

<sup>70</sup> Hauser, 298.

<sup>71</sup> <https://claude.ai/chats>, accessed, March 14, 2024. Again it is interesting to note the formulation of 'Two people who I won't' as opposed to 'I can't' identify as node to concerns for privacy.

<sup>72</sup> ELIZA was developed by Joseph Weizenbaum at MIT in 1966 as a program "which makes natural language conversation with a computer possible." Joseph Weizenbaum, "ELIZA—a Computer Program for the Study of

‘navigate open-ended prompts and sight-unseen scenarios with remarkable fluency and human-like understanding’ is unable to distinguish depth.<sup>73</sup>

The fact that the two people also wearing denim—bringing body and dimension to the photo of the textured denim above it— is also a photo and part of the same image assemblage and not in fact two people looking at images in a gallery, something that is amply obvious to the human eye, completely eludes the eyes of the machine model. The image is ‘seen’ as exterior to the assemblage, an observer *of* a scene instead of part of the scene resulting in an algorithmic flattening of volume, surface, depth, shadow, intensity – qualities that the work argues are a fundamental aspect of affect and its materiality. This flattening is ideologically genealogical to Lorde’s ‘word of flattened affect,’ one that ‘robs our work of its erotic value, its erotic power and life appeal and fulfilment.’<sup>74</sup> It appears again in the creases and topologies of the frottage that Macharia produces as he looks into intimate lives and intimate practices.<sup>75</sup>

Yuk Hui notes in his essay *Anamnesis and Re-Orientation: A Discourse on Matter and Time* in the volume *30 Years after Les Immatériaux*, that as digital technologies are becoming the ground for all forms of governance and communication traversing all types of scientific and humanistic research methods, they are developing their own epistemologies.<sup>76</sup> Almost 40 years ago Lyotard saw the development of a new ontology of interaction between technological objects and the humans interacting with them, ‘an ontology of the transmission of a message without end.’ This interaction where man alternates between being the transmitter, the receiver, sometimes the referent and sometimes a code brings forth a ‘plasticity of humans.’ Lyotard continues by noting that ‘[T]his plasticity of humans means that this structure of communication today seems like something upon which identities can no longer be fixed,’ instead they rub against each other, a frottage that is political and sexual, semiotic and cultural, a kinkiness that is material but also nuanced, as all kinks are.<sup>77</sup> It is this very plasticity that algorithmic infrastructures have the ability to unlock and expound upon. For this to take place, machine learning models and algorithmic infrastructures need to account for material affectivity, including the materiality of thought, images and language, and as Manuel DeLanda urges, allow materials

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Natural Language Communication between Man and Machine,” *Communications of the ACM* 9, no. 1 (January 1966): 36–45, <https://doi.org/10.1145/365153.365168>.

<sup>73</sup> <https://www.anthropic.com/news/claude-3-family>, accessed March 4, 2024

<sup>74</sup> Lorde, “Uses of the Erotic: The Erotic as Power,” 53.

<sup>75</sup> Macharia, *Frottage*, 33.

<sup>76</sup> Yuk Hui, “Anamnesis and Re-Orientation: A Discourse on Matter and Time,” in *30 Years after Les Immatériaux: Art, Science and Theory*, ed. Yuk Hui and Andreas Broeckmann (Lüneburg: meson press, 2015), 16.

<sup>77</sup> Jean Francois Lyotard, “After Six Months of Work... (1984),” in *30 Years after Les Immatériaux: Art, Science and Theory*, ed. Yuk Hui and Andreas Broeckmann (Lüneburg: meson press, 2015), 36.



to 'have their say in the structures we create.'<sup>78</sup> Such a move, one that looks at transmodality instead of multimodality, has the potential to foreground the unruly self that is defined by constant transformation, as ultimately is intelligence itself, be it human or artificial. This can only come to be when a liberation from the 'the prostheses of normativity and stereotypes' that currently underscores algorithmic architectures occurs. The Lucretian notion of constant flow and transformation is part of how intelligence can be understood, or as Malabou argues, 'as the pure circulation of energy, ultimately intelligence consists only in its transformations.'<sup>79</sup>

In *The Courage to Matter*, where matter is both the sticky materiality that makes up the cohesions and rubbings in and of the physical world and a call to action, making, making sense, mattering and care, Johnny Golding calls for 'the courage to grasp and engage with multi-dimensional surfaces.' Godling makes a passionate call for 'inhabiting' art and humanity as part of 'a certain kind of techne' that invites 'moveable limits' and 'proliferation' as part of the radical matter that her own work and practice has developed and is committed to.<sup>80</sup> *The Courage to Matter* is a call to action, to make, resist and reject simplistic worldviews and imagine a world where the shaping of reality brings technology and human together in a novel assembly. This relationship can be best viewed as a relationship to craft, where craft goes back to its origin as strength and skill, and of bringing together the three grids that have emerged from each chapter. The affective, the sensory and conversational, and the kinky grid: each one is 'crafted' using different types of weaves and expositions of a self in constant becoming and with different types of entanglement with technological artifacts.

What these interpolating grids all share is the notion of affect as central to the creation of meaning and an elaboration of the self as it rubs against and with technological infrastructures. They call for an approach to technology as an epigenetic atmosphere, the primacy of an embodied and performative materiality and an exposition of depth and nuance as fundamentally foreign to algorithmic logics. The kinky grid that emerges through these image assemblages - with their material rubbings, their resistance to fixed meaning, their embrace of the erotic and the unpredictable - offers a model for how algorithmic systems can be recrafted. Rather than flattening affect into manageable datasets, a polymorphous framework suggests ways to maintain the rich dimensionality of human experience as it engages with technological systems.

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<sup>78</sup> Manuel DeLanda, "Material Complexity," in *Digital Tectonics*, ed. Neil Leach, David Turnbull, and Chris Williams (Chichester, West Sussex, U.K. ; Hoboken, NJ: Wiley-Academy, 2004), 21.

<sup>79</sup> Malabou, *Morphing Intelligence*, 139.

<sup>80</sup> Golding, "The Courage to Matter," 486.

Through these material encounters and their deliberate kinking of patterning, algorithmic seeing might be transformed from a process of reduction to one of expansion and possibility.

## Epilogue: A Way Forward



Figure 49: Detail of Dimitris Pikionis' Pathway

I stoop and pick up a stone. I caress it with my eyes, with my fingers. It is a piece of grey limestone. Fire moulded its divine shape, water sculpted it and endowed it with this fine covering of clay that has alternating patches of white and rust, with a yellow tinge. I turn it around in my hands. I study the harmony of its contours. I delight in the way hollows and protrusions, light and shadows, balance each other on its surface, I rejoice in the way the universal laws are embodied and fulfilled in this stone—the laws, which according to Goethe, would have remained unknown to us had not an innate sense of beauty revealed them to the poet and the artist.<sup>1</sup>

One last grid: between 1954 and 1957 the architect Dimitris Pikionis was commissioned by the Greek government to develop a large portion of the 80,000 square meters pathways around Acropolis and the neighbouring Philopappou Hill. Pikionis reclaimed clay, marble and stones from recently demolished buildings bringing along their material and resonant social and political memory and based on loose drawings asked his students at the Polytechnic University of Athens to compose and craft the patterns that made up the pathway. As a result, each student imbued their own gesturality to this complex choreographed patterning of varied

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<sup>1</sup> Dimitris Pikionis, “A Sentimental Topography. Originally Published in 1935 in the Greek Art Magazine ‘Το Τρίτο Μάτι (The Third Eye),’ *Dimitris Pikionis, Architect 1887 - 1968: A Sentimental Topography*, ed. Architectural Association London (London: Architectural Association, 1989), 68.

textures and shapes while following the natural flow of the landscape, resulting in a pluralistic design that is in complete harmony with its surrounding environment. Pikionis goal was to orchestrate an emotional journey for the visitors where curiosity, surprise and a communion with the surrounding environment were entangled.

The architect Kenneth Frampton, when visiting the pathway writes that he ‘sensed, with great surprise, the almost literal movement of the landfall as my frame was drawn by gravity and by the tactile grip of the paving, up and down the undulating labyrinth of the terrain; a site that was to be experienced as much by the body as by the eyes.’<sup>2</sup> A synaesthetic transmodality then becomes part of this intricate pattern that was composed by intuition, time and duration and the way that materials flow in situ, following their own logic and memory and creating unexpected narratives and affective adjacencies. Later in the same essay Frampton continues:

Close to the 'not yet' of Ernst Bloch, Pikionis' architecture was an architecture of hope. While he was all too aware of the growing harshness that was enveloping his beloved Greece on every side, he nonetheless evoked a vision of a Mediterranean civilization that was 'other,' a Baudelairean sense of *luxus* shimmering in the light, after the fall of technology.<sup>3</sup>

The patterned grid that Pikionis brought to life carries all the characteristics that *The Unruliness of Matter* seeks to insert into the architecture of sociotechnical systems, inevitably led and developed around the conceptualisation and deployment of artificial intelligence networks: memory, history, affect, materiality, plurality, depth, embodied narratives.

Like Muñoz, Frampton connects Bloch’s ‘not yet’ to hope, a hope that brings othering in opposition to technology inserting yet again poetry as a process in the making of an imaginary; an imaginary that can indeed luxuriate in depth, surface, volume and the shimmering of material bodies and the agency they hold. This agency becomes a call for responsibility and action. Imagining and participating in the future not as passive observers, or ‘users’ as the term would have it, but as poets that can strategically intervene in political and kinky ways in the making and consumption of algorithmic architectures: this brings hope and depth together.

The process of bringing this poetic imaginary to algorithmic systems is at once simple and complex. It involves bringing together kinky hair, kinkiness, kinky nanotubes, in other words

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<sup>2</sup> Kenneth Frampton, “For Dimitris Pikionis,” in *Dimitris Pikionis, Architect 1887 - 1968: A Sentimental Topography*, ed. Architectural Association London (London: Architectural Association, 1989), 6.

<sup>3</sup> Frampton, 9.

the nuance of kinkiness in all its complex materiality and the infinite canvas that is the ever-unfolding image of thought, the rubbings, musings and numbings of distressed bodies and psychic parts so new systems can emerge not yet defined or imagined, reclaiming technology as an act of poesis. It involves tuning into a community of interdisciplinary practitioners, embracing atonal resonance and the metonymy of the frame while working to create new interfaces and networks of thought in interactions with sociotechnical systems.

The grids proposed in the *Unruliness of Matter* and the framework that emerges from its tripartite practice are indeed understood as communal interfaces and each one in its own way antagonises and challenges established narratives of what technological infrastructures and the future of algorithmic culture is and could be.

Despite the recurring hype cycles that surround artificial intelligence capabilities, in reality there is a considered and considerable effort to debunk what some researchers call ‘the reanimation of pseudoscience in machine learning’ that claim to infer sexual orientation, criminal behaviour, and ‘abnormality’ classifications and instead acknowledge that ‘scientific practices, and the knowledge they produce, are shaped by human normative values.’<sup>4</sup> A call for a deeper engagement with historicity and a move away from quantification and the pseudo-objectivity that is attached to machine learning models is a call towards a pluralistic and affective understanding of the epistemic and ontological implications of developing models that affect how lives are lived and value circulates.

The insertion of a poetic and affective sensibility in the interactions and deployment of such models is what all three chapters advocate and exemplify, by challenging and conversing with technological infrastructures and the epigenetic environment that contains it.

There is a growing body of work, led by Yann LeCun, Chief AI scientist at Meta, professor at New York University and proponent of open-research, that argues that current AI systems lack persistence of memory, the ability to reason, and understand the physical world while ‘the ability of humans and many animals to learn world models, internal models of how the world works’ is what sets them apart from machine learning systems and accounts for their ability to interact with the world in a multi-dimensional manner and ‘conceive multilevel abstraction.’

LeCun stresses the importance of developing a model that can indeed account for the physical world and demonstrate some sort of ‘common sense’ although he acknowledges that

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<sup>4</sup> Mel Andrews, Andrew Smart, and Abeba Birhane, “The Reanimation of Pseudoscience in Machine Learning and Its Ethical Repercussions,” *Patterns* 5, no. 9 (September 13, 2024), <https://doi.org/10.1016/j.patter.2024.101027>.

how to ‘devise trainable world models that can deal with complex uncertainty in the predictions’ is a major technical challenge.<sup>5</sup> It is also an epistemically and ontologically complex one and *The Unruliness of Matter* argues that a performative ontology can point to a way forward for a reconceptualization of human-machine assemblages and for a maturing, tentacular and emergent relationship with new types of unknown emergencies.

The more attempts are made to model the physical world for AI systems to navigate it and ‘reason’ about it, the more clear it becomes that atomic materiality is in communion with a psychic one, which in turn points to the shared ethics with all of nature and the complex affective intensities that make up humanness and its relationship to the constant swirl of motion.

The path forward then lies not only in the further refinement of existing algorithmic models, but in a fundamental rethinking of the relationship between human and machine and in the creation of a new logic that brings them together. By embracing the kinkiness of matter, the polymorphous nature of affect, and the transformative potential of the poetic, new possibilities for technological development emerge, ones more attuned to the complexities of human experience. Insistent experimentation, curiosity, a tactile sensibility and an openness to the unknown and unpredictable nature of any form of life, human or machinic, is art and poetry’s responsibility—a responsibility to keep probing, prompting and exposing the affective lacunas of algorithmic systems.

The polymorphic framework, formed out of matter and its participation in an emerging sociotechnical ontology that the three chapters outline weaves together new affective and embodied encounters, proposing making as a model of action that brings together embodied experience, affect, sensory conversations and kinkiness into and through an interlocutory sympoietic relationship with algorithmic systems. In its capricious configurations and following the logic of sense, matter affects the systems that it comes in contact with, and in that sense remains infinite, elusive and escapes sterile and monolithic objectivities.

The rubbings that take place across the three chapters are also a reminder that fear, desire, pathos and their associated discomfort are what makes up the beingness of being human, what drives art and poetry and what currently remains elusive to algorithmic systems. And that is fine. The challenge is not to forsake them so humans become more like frictionless machines, but that machines and algorithmic logics can allow for the humility and exaltation that comes from affective entanglements with matter.

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<sup>5</sup> Yann LeCun, “A Path Towards Autonomous Machine Intelligence,” OpenReview, accessed September 18, 2024, <https://openreview.net/forum?id=BZ5a1r-kVsf>.

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