



THE ALGORITHMIC REIMAGINATION

Exploring critical making with algorithmic tools in new media art

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P. (Kwan) Suppaiboonsuk
1090135

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Supervisor: Michiel de Lange
Second reader: Gerwin van Schie

Abstract

This study examines the creative potentials of algorithms and how AI tools may be utilized by media artists to reappropriate them from tools of discrimination to tools of liberation. Through a case study and a critical making assignment, key findings regarding AI affordances are identified and related to appropriation in creative practice through the lens of play theory. AI affordances offer a range of possibilities for creative practices, which, when creatively appropriated, redefine the values and purposes of algorithms. The reflective capabilities of algorithms allow for deeper reflections on societal issues, making media art a powerful platform for addressing algorithmic bias and sparking critical discussions. Insights derived from critical inspection of tools and creative practices are used to develop the notion of the algorithmic reimagination. Algorithmic reimagination is a notion that embodies skills and attitudes that seek to challenge the dominant logics of algorithms and open pathways for actions. By embracing the spirit of play and imagination, artists can engage with algorithmic tools to provoke discussion, while envisioning a more just and equitable future. This paper highlights the significance of the algorithmic reimagination in shaping the narrative and impact of algorithms in contemporary society and in paving the way for a more inclusive and ethical AI culture from the domain of media art.

Keywords

AI as creative materials, playful media culture, generative AI, algorithmic tools, affordance, reappropriation, imagination, sociotechnical imaginaries

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Introduction

“The master’s tools will never dismantle the master’s house” — Audre Lorde

Originally rooted in the context of race and feminist movements during the civil rights era of the 60s, Audre Lorde’s thesis remains relevant for our contemporary algorithmic culture. While the quote addresses the oppressive structures of a racist patriarchy within a broader discourse of race theory, today’s digital infrastructures are still embedded with elements of oppression as algorithms¹ play a dominant role in influencing behaviors and mediating power (Kitchin, 2017; Velkova & Kaun, 2021). In a society where technology is built upon computational algorithms, algorithms have come to have an extended definition into realms beyond mathematics and computers, such as politics, economics, and culture (Kitchin, 2017; Seaver, 2019). The implications of algorithms in the everyday of our society is in the politics of technology and what certain apps, devices, or platforms allow for certain groups of people to do or not do. Algorithms are often engrained with bias by design and instilled with a frame of perception from those with power (Bartoletti, 2020).²

The master’s house of contemporary society is a structure of algorithmic dominance that is driven by digital capitalism. As algorithms are fuelled by data, practices of persistent quantification arise and neoliberal ideals drive relentless datafication, treating many aspects of life as commodity (Sadowski, 2020). This datafication, especially when top-down³, raises the concern of algorithmic governance and control, as norms of quantification, classification, and surveillance are enabled. Due to the data workflows and seamless processes, algorithms are often hidden and their workings not easily comprehensible (Kitchin, 2017). Obfuscated in lines of code, algorithmic logic becomes inscrutable and tends to result in a loss of human agency (Rieder, 2016). Furthermore, our cohabitation with algorithms makes it difficult to step outside structures of dominance (Wiehn, 2022).

Within the context of AI and art, algorithmically-driven art (especially generative machine learning models and systems) contributes to our visual culture, which in turn plays a role in how we conceptualize our reality. The politics of these algorithms are evident in various levels, from database (Crawford & Paglen, 2021) to imagemaking techniques (Offert & Phan, 2022) to

¹ An algorithm can be defined as a set of clearly defined procedures that takes an input and transforms it into an output (Cormen, 2009).

² For this study, I would like to stress that the terminology used between code, algorithms, neural networks, and AI may be used interchangeably. I acknowledge the different definitions in the terminology, but for the purpose of this study, the differences between the terms do not make a difference. When these terms are used, they can be referred to the algorithmic system at large, which comes with inherent bias.

³ When the process of collecting and utilizing data is initiated or regulated by a governing organization like governments or corporations.

outputs and their contexts (Birhane et al., 2021). Machine bias and discrimination show up in generative AI media to further permeate existing harmful narratives and stereotypes (Edenberg & Wood, 2023; Kidd & Birhane, 2023; Sun et al., 2023). As the process of developing algorithms can be laborious (in collecting data) and require coding skills and possibly computational resources, many artists turn to accessible AI tools available online. The development and deployment of these tools are often driven by big tech companies (Nitzberg & Zysman, 2022). In the spirit of Audre Lorde, “what does it mean when the tools of a racist patriarchy are used to examine the fruits of that same patriarchy?” How can an artwork engage its audience to act towards social progress when built upon tools that threaten it in the first place? How can artists⁴ counter the dominant logics of systems of algorithmic oppression and its principles?

Creative practices have been shown to provide an avenue for repairing the unbalanced power dynamics caused by these algorithmic systems (Velkova & Kaun, 2021). In the field of critical data studies (boyd & Crawford, 2012; Dalton et al., 2016; Illiadis & Russo, 2016) and tactical media (Raley, 2009), algorithmic antagonism identifies practical approaches for political agency, influence, and resistance through reconfiguration (Pötzsch & Pereira, 2022)⁵. As a creative practice and method, critical making is a hands-on approach for exploring the connection between technology and society that allows me to engage with algorithmic tools on a material level (Ratto & Hertz, 2019)⁶. In this study, I investigate the creative practice of critical making behind artworks that have playfully utilized AI tools. I am interested in exploring the creative potential of algorithms and how they may be repurposed in order to (1) critique the techno-capitalist system from which it rose from and (2) generate new perspectives and future imaginaries. With a combined approach of affordance analysis and critical making, I ground the modes of algorithmic resistance in algorithmic tools as I seek to build upon and expand the concept of algorithmic antagonism.⁷

Research Question

My main research question for this study is:

How can we use critical making centered around AI to recursively critique algorithmic systems and cultures; and in doing so, resist the algorithmic dominance that comes with the tools used?

The question is explored in two parts: (1) through a case study of Andreas Refsgaard’s *Poems About Things* (2019) and (2) through a practical examination by creating a visual poetry piece

⁴ Here, ‘artist’ is defined in the broad sense to be someone who creates and expresses without any limitations to medium or professional capacity.

⁵ Algorithmic antagonism is further detailed in Theoretical Framework section as groundwork for algorithmic reimagination.

⁶ The method and practice of critical making is explained in more in the Theoretical Framework section.

⁷ This is further explained in the Positioning section.

using generative AI tools (ChatGPT, Zeroscope, Stable Diffusion, and Stable Diffusion Deforum).

In these two parts, the following sub questions are examined:

1. What are the affordances provided by the algorithmic tools and how may it be reappropriated?
2. How can art as a critical practice tease out critical perspectives surrounding the tools deployed?

Using the insights gained in this research, I circle back to theoretically develop a new concept of 'algorithmic reimagination', which serves as a proposed answer to the main research question.

The algorithmic reimagination

Similarly to how the algorithmic imaginary refers to how people's beliefs of algorithms and how they should work (whether or not that is actually how it is) (Bucher, 2017), the algorithmic reimagination refers to the repurposing of algorithms that have been deployed. How can the functionalities that are already there be utilized to create new perspectives, critiques, and future imaginaries? The act of algorithmic reimagination is one of expanding or generating new algorithmic imaginaries that help people to diversify their conceptualizations of AI. In doing so, they are given the capability to critique the algorithmic systems they cohabit and the algorithmic culture they find themselves in. This reclamation of agency allows us to redefine the ways algorithmic tools are utilized and remediate the algorithmic dominance that comes with it.

The algorithmic reimagination is meant to broadly illustrate actions and attitudes for algorithmic resistance. As a broad umbrella term, this notion allows for the connection of similar typologies proposed by different literature: algorithmic antagonism (Heemsbergen et al., 2022; Pötzsch & Pereira, 2022), oppositional affordances (Miloni & Papa, 2022), and imaginative logics (Pelzer & Versteeg, 2019). By expanding beyond the term 'algorithmic antagonisms', we are able to consolidate the concept with imaginative logics, taking into account the role of imagination in algorithmic resistance. By mobilizing imagination as agency, we lower the barrier for engagement in everyday acts of algorithmic resistance. People can be empowered to creatively utilize existing algorithms to resist the conventional practices and ideologies surrounding algorithmic systems and cultures. Furthermore, with a broader scope, algorithmic resistance is no longer limited to modes of action and can also include attitudes and skills, which I hope will open avenues from which future research in algorithmic literacy can be grounded upon.

Positioning

Apart from theoretical contribution, the innovative approach of my research provides a unique perspective and methodological contribution to the field of critical data studies and tactical media. Even though critical making is explained in more detail in the *Theoretical framework* chapter, I would like to note that the term is not used too religiously in this research and applies a general sensibility that comes with the approach. This being, a critical dissection through hands-on practice that allows for academic and artistic practices to go hand in hand. To aid in the consolidation of practical insights to theory, play theory (Huizinga, 1970; Sicart, 2014) is utilized as a lens for this research. Given the goal of merging concepts from algorithmic resistance with those of imagination, play theory provides a suitable framework to do so.

As I engage in the process of critical making myself, I would like to provide the underpinning perspective of this research by explaining my position as a maker. My own making practice is rooted in poetry as sensemaking. With a spirit of play and curiosity, I engage with emerging technology to better understand how they may be applied to enrich the human experience and our understanding of the self.⁸ This personal practice has been a guiding force for the choice of case study and critical making assignment.

In *Poem About Things* (Refsgaard, 2019), poetry composed of quirky sentences is algorithmically generated from everyday objects that are seen through the user's camera. This case was chosen due to the combinatorial approach used in which Refsgaard works with AI as a material. Meanwhile, for my own critical making assignment, I had chosen to produce an audiovisual around the topic of hands. Hands embody meanings around making and connection. With generative AI being able to "create" things as well, I became intrigued by the idea of AI-generated hands — how AI has struggled to generate human hands and how we humans are made to feel by AI's growing capacity for creativity and creation. With the topic and theme holding a lot of layers in meaning, I could play with the tensions in our relationship with AI.

⁸ This practice is represented in how I approached the critical making assignment, in which the process taken is detailed in Part 2 of the Research Methodology section.

Overview of chapters

This thesis is composed of 7 main chapters. In this *Introduction* chapter, I have given a brief overview of the topic of this study, outlined the questions that will be explored, proposed a hypothesis, and explained my positioning. In the next chapter *Theoretical framework*, I introduce theories and methods that lay the foundation for this thesis and how they will be used in the analysis work, with three main components: affordances & reappropriation, imaginaries & groundwork for algorithmic reimagination, and critical making & play. The *Research Methodology* chapter outlines the approach taken to explore the research questions.

The analysis chapters are split into 3 different chapters. The first one *Case study: combining algorithmic tools* performs affordance analysis on the way algorithmic tools are used in Andreas Refsgaard's *Poems About Things* (2019), along with how he engages with reappropriation in his practice. The second chapter *Critical making: exploring generative AI tools* explains starts off with a textual analysis of the audiovisual work I have created as part of my critical making practice. This is followed by an affordance analysis of the generative AI tools used and how they have been reappropriated. Drawing insights from both the case study and my own critical making, this chapter closes with the key starting points and questions to be considered to guide creative practices when reappropriating algorithms and AI tools for algorithmic resistance. The third analysis chapter circles back to theory, in order to develop the notion of algorithmic reimagination.

Finally, the concluding chapter contains a summary of key findings, a methodological review (including reflections on working with generative AI tools), suggestions for future research, and final remarks.

Theoretical framework

This chapter is split into three sections, each exploring different theories that are substantial for this research: (1) Affordances & Reappropriation, (2) Imaginaries & Groundwork for algorithmic reimagination, and (3) Critical making & Play. The first section details affordance theory, as well as theories on how users redefine media. The second section explains theories around imaginaries and typologies that provide the groundwork and inspiration for my proposed notion of algorithmic reimagination. The third section intertwines critical making and play to further strengthen the position from which my critical making assignment builds upon and flows into the development of theory.

Affordances & Reappropriation

The concept of affordance was first introduced by Gibson (1979) as actionable properties of objects within its environment, independent of whether the affordance is perceived or not. In the field of design and human-computer interaction, the concept is expanded upon by Norman (1988). Norman argues that affordances are design properties of an object, which informs how it should be used, and are perceived by users within specific cultural frameworks. Affordances can emerge through direct interaction with the object, but are often shaped by earlier affordances and require active cultural effort. Affordance theory provides an entrypoint for understanding and unlocking possible possibilities in reappropriation when analyzing AI tools.

In *How Users Define New Media: A History of the Amusement Phonograph*, Lisa Gitelman (2003), tells the story of how technology is not only shaped by inventors and entrepreneurs involved in the production process, but is also shaped by consumers. Through the case of the phonograph, Gitelman argues that the phonograph and records are technologies, commodities, *and* media as well. Because of this, it has an “interpretive flexibility” in which meanings can be defined by anyone and the power for meaning making for the technology/media does not belong to any particular authority. The progress of the phonograph and its technological evolution is a social practice. Based on this viewpoint, this thesis builds on the notion that algorithmic tools and their functionalities are not only determined by those who have designed and developed the tools. This concept enables me to consider in the analysis how agency can be injected to reappropriate an affordance.

In *Art and the science of generative AI: a deeper dive*, Epstein et al. explore the creative potential of generative AI systems and provide an overview of the technology’s impact across themes of culture, creativity, economics, and law, in order to inform policies around the technology (2023). Epstein et al. further argue that generative AI is a new medium that comes with its own set of affordances that allows for it to be used as supporting tools for creators and artists, all the while reflecting contemporary issues surrounding automation, the attention economy, and corporate control. To ground the discussions around AI art around intent,

predictability, and accountability, the concept of meaningful human control (MHC) is introduced. MHC is a framework to define the degree of creative expression that creators can have through generative systems (Epstein et al., 2023). This framework helps to inform the analysis on connections between affordances identified and the amount of agency the artist has in utilizing the AI tool for their benefit.

Imaginaries & Groundwork for algorithmic reimagination

At the points in which humans and these algorithms meet, the hidden technical constructs of our digital infrastructure have led to the formation of the algorithmic imaginary (Bucher, 2017). This imaginary is the way in which people think algorithms are — how they work, how they should work — even if it may not be entirely correct. What comes with it is also the socio-technical imaginary on how algorithms affect our lives on a day-to-day basis, and vice versa. In *Dreamscapes of modernity*, Jasanoff & Kim (2015) argues that sociotechnical imaginaries are active agents that play a role in the development and governance of technology. These imaginaries are influenced by cultural and political factors and are reflective of collective values and norms. As imaginaries are subject to negotiation, those who know how to influence or shape them hold power in determining how technology may be applied (Jasanoff & Kim, 2015). These theories on imaginaries are used to position the concept of algorithmic reimagination in a lineage of other notions. In my critical making, as I engage in the analysis of affordance of and values embedded within algorithmic tools, I engage directly with these imaginaries to understand how the tools work in between input and output. In reappropriating the affordances, I am redefining new imaginaries.

Three different typologies from different studies are described in the paragraphs below. They are used to inform the developing theory on algorithmic reimagination, as well as position the concept further.

In *Introduction to algorithmic antagonisms: Resistance, reconfiguration, and renaissance for computational life* by Luke Heemsbergen, Emiliano Treré, and Gabriel Pereira (2022), algorithmic antagonisms refer to the act of reconfiguring algorithms as a means of political resistance. Through this concept, Heemsbergen et al. highlights different forms of data activism and creative interventions that critically engage with algorithms to challenge power imbalances and drive social change. Algorithmic antagonisms are not just a resistance to algorithms that oppress, but are also efforts of reconfiguration and reimagination of algorithmic/ computational systems for a more just and equitable society (Heemsbergen et al., 2022). Providing a typology for algorithmic antagonism, in *Reimagining Algorithmic Governance: Cultural expressions and the negotiation of social imaginaries*, Pöttsch & Pereira (2022) combine frameworks of Castoriadis, Ranciére, and Mouffe, in order to develop terminology that allows for a better understanding of the workings of our contemporary datified society and the social imaginaries that exist around algorithmic governance. Injecting theory with the examination of a series of artistic works that critically engage with issues surrounding algorithmic governance, they identify

the ways in which art can challenge dominant logics of speaking, doing, and sensing: appropriating, rejecting, inverting, and creating alternatives. These tactics are rooted in a radical imagination which allow for the re-assertion of human agency and control in technical systems that continue to grow in complexity (Pötzsch & Pereira, 2022). Another framework that is rooted in imagination is that of Pelzer & Versteeg (2019): imaginative logic, a principle of underlying dynamic in producing futures, whether speculative or real. This concept makes the abstract phenomenon of imagination a tangible process that can be used to activate societal change. The typology contains five categories of imaginative logic: doable, juxtaposition, defamiliarization, guerilla, and procedural. Each type of logic describes different types of futures and have different intended audience (re)action (Pelzer & Versteeg, 2019). These typologies from Pötzsch & Pereira and Pelzer & Versteeg are used to help incorporate ties to imagination with algorithmic resistance.

From the same journal as Heemsbergen et al. on algorithmic antagonism, *The oppositional affordances of data activism* by Milioni & Papa (2022) studied multiple data activism projects to uncover oppositional affordances, which are unexpected, unintended, or 'incorrect' uses of affordances. If the 'imagined affordances' are correct, then users must have identified dominant/hegemonic uses. These notions surrounding algorithmic antagonism are the cores from which the notion of algorithmic reimagination grows from. To further strengthen this expansion of concept, Ettliger (2018) argues that typologies for algorithmic resistance do not necessarily have to be antagonistic, but may also be "productive", referring to more salient modes of resistance.

Critical making & play

More a practice than a method, critical making engages with technologies on a material level in order to reflect critically on the socio-cultural values embedded and embodied by the technological artifacts. This critical design practice is process oriented and encourages building of materials that can productively engage people in the re-evaluation of the roles of technology in society (Ratto & Hertz, 2019). At its core, critical making merges the realms of critical design and reflective design. In critical design, the focus is on making consumers aware of the values, ideologies, and established norms embedded in everyday objects. By revealing these underlying interests, critical design prompts users to question the assumptions inherent in the designs they encounter (Dunne & Raby, 2001). Reflective design, on the other hand, encourages users to actively reflect on their relationship with technical objects, disrupting the passivity often associated with consumer-producer dynamics.

Critical making and play go hand in hand. As play is a way of expression and can be an approach for combating efficiency, seriousness, and technical determinism, play supports the explorative nature and the open-ended structure of critical making. Play is defined as contextual, carnivalesque, appropriative, disruptive, and personal. In its basic form, play is contextual, as it is bounded by a set of rules. Therefore, to play is to think of/about/through the

rules and dance with it, adapting to the boundaries, and possibly even changing or manipulating it. As play has an expressive capacity that balances between creation and destruction, values can be challenged through play. When oppressive structures are dismissed, play is considered to be carnivalesque and freedom is created through play (Sicart, 2014). As we explore the sociotechnical borders of an AI tool through critical making, play allows for first-hand insights through learning by doing. As we play we collect insights and start to form an understanding of the rules of AI, allowing us to better

Play is fundamental to human culture and contributes to the generation and development of culture. Play is a transformative force that allows for engagement with symbolic meaning, establishment of social order and boundaries, and facilitation of learning and transmission of cultural knowledge (Huizinga, 1970). This helps us to learn and understand the affordances of AI, even when we do not have a clear understanding of what is happening behind the black box of the algorithms.

Even though play is contextual, it cannot be predetermined by context; thus, making play appropriative. Through play, individuals find appropriation for their context. Consequently, play is disruptive. When play takes over the context in which it takes place, it has the capability to break the status quo, revealing existing conventions, assumptions, and biases (Sicart, 2014). Together, critical making with play enables me to properly understand how I can appropriate the AI tools and media in my practice.

In applying the theories of play into critical making as a practice, I am able to approach software beyond its functions. As the amount of meaningful human control may be limited by AI tools, claiming a playful attitude allows for the reclamation of agency. Together, critical making and play allows for us to go beyond coexisting with algorithms and come together to imagine new ways of being. Through play, we can understand the world, challenge establishments, and generate new knowledge and practices. For this study, these concepts from play theory provide a lens for examination and further development of theory.

Research methodology

The analysis is composed of two parts, each utilizing different methods: (1) affordance analysis and (2) critical making. The first part analyzes an artist's critical making practice. The case study is analyzed with affordance analysis to understand how the artist has appropriated the affordances of AI as a tool. The second part details the process taken in my own critical making to gain first-hand insights on AI tools and creative practice. Based on the insights gained from analysis, I intend to go full circle from analysis back to theorizing in order to conceptualize the term 'algorithmic reimagination'.

Part 1: Exploring the creative potential of algorithms through affordance analysis of a creative coding case study

Affordance analysis is done on the algorithmic tools used in Andreas Refsgaard's work *Poems About Things* (2019) in order to understand how the artist/maker has reappropriated the affordances of algorithms for their work through the lens of play. Affordance analysis allows for an investigation into the black box nature of AI, which provides a game-like environment where creative reappropriation of algorithms can be studied and explored through play. The link between the input and the output is dynamic. To play with AI is like testing the boundaries of a quasi-game and can be done by feeding in specific types of input in order to explore outputs. By studying how these artists (re)define the media of neural networks through affordance analysis, this study hopes to gain insights on the nature of algorithms in our algorithmic culture and the role of imagination in a society of human-machine symbiosis.

Part 2: Critical making with generative AI for first-hand practical insights

As I explore the tensions of using algorithmic tools to examine the burdens of an algorithmic society, critical making allows me to appropriately examine the potentials of these tools. By viewing algorithms as material and shifting them from "matter of fact" to "matter of concern", critical making provides a point for critical reflection in how we perceive and interact with these technical systems.

By disrupting the cycle of overworking, overproducing, and over-consuming, critical making allows for opportunities to arise for individuals to step back and contemplate the broader human experience and culture. It prompts people to consider what it truly means to be human and how societal values and behaviors are reflected in the technology we create and use.

Through critical making, the second part of this study includes a hands-on investigation of AI tools in order to build a poetic⁹ audiovisual piece on human hands (process detailed under *Process taken*). With hands embodying the spirit of making and human's ingenuity and creativity, along with the difficulty for generative AI to generate hands, this work plays with the tensions of creation in the age of AI. The work is meant to show the creative potential of algorithms in diverting attention and questioning values ingrained in generative AI systems. Through this work and the approach taken to create it, I attempt to explore the logics of creative and cultural production through art.

As I work towards building a poetic audiovisual piece, through critical making, I engage with four different AI tools:

1. A large language model (Open AI's ChatGPT)
2. A text-to-image diffusion model (Stable Diffusion from AUTOMATIC1111 & Deforum for generating animations)
3. A text-to-video model (Zeroscope)
4. Text-to-speech model

Through explorations in the text generation, I draw inspirations for the audiovisual. The end product combines text scripts, including a poem, and the animated images to create an audiovisual piece. Even though text-to-speech is used in the making process, the focus is on the generative text and visual tools. Once the resulting audiovisual is complete, I perform a textual analysis in order to gain deeper insights on the dominant values ingrained within the models and tools used. Reflections are noted on the creative process, with regard to outcomes from part 1. Reflections on the generative AI tools used are included in the concluding section under methodological review.

Process taken

To begin, I went into conversation with ChatGPT to gain insights on why hands are so important - what are the cultural values and the symbolisms around hands. This also allowed me to engage myself in the algorithmic imaginary of how ChatGPT works, as I tried to draw connections between my input prompts and the output results.

In the first part of the audiovisual, I put together a series of video clips of hands performing some sort of action. These actions were from a list generated by ChatGPT when I had given it the following prompt: "Give me a list of poetic words of actions that can be done with hands". With zeroscope, a recently released text-to-video model at the time of making, I was curious how an AI model would interpret these actions; what is the collective consciousness embedded within the model regarding hands and actions involving them.

⁹ Poetic being a quality that allows for a deeper and sensuous experience

Having prompted the audience with the performance of hands, I decided to have AI describe hands in the second section. I asked ChatGPT to describe a hand and based on the descriptions, I generated animated visuals based on the text using Stable Diffusion DeForum. In doing so, I have tasked a third observer, a separate entity, to explain what a human hand looks like, bringing a different lens into how we view our hands.

The final part of the audiovisual performance involves a poem generated by ChatGPT through the simple prompt of: "Write a poem about hands". I recorded myself reading the poem and put it together with background music (not generated by AI) and a collection of still images generated in Stable Diffusion with the prompts of "hand" and "hands". The reason for choosing to read the poem myself is that the quality of text-to-speech is not where I would like it to be yet for spoken word poetry.

Case study: combining algorithmic tools

To better understand the nature of algorithmic tools and how they can be appropriated (as phrased in research sub questions 1 and 2), a case study is analyzed. This section contains the affordance analysis of the algorithmic tools (object recognition and Google Suggest API) used by Andreas Refsgaard in his work *Poem About Things*.

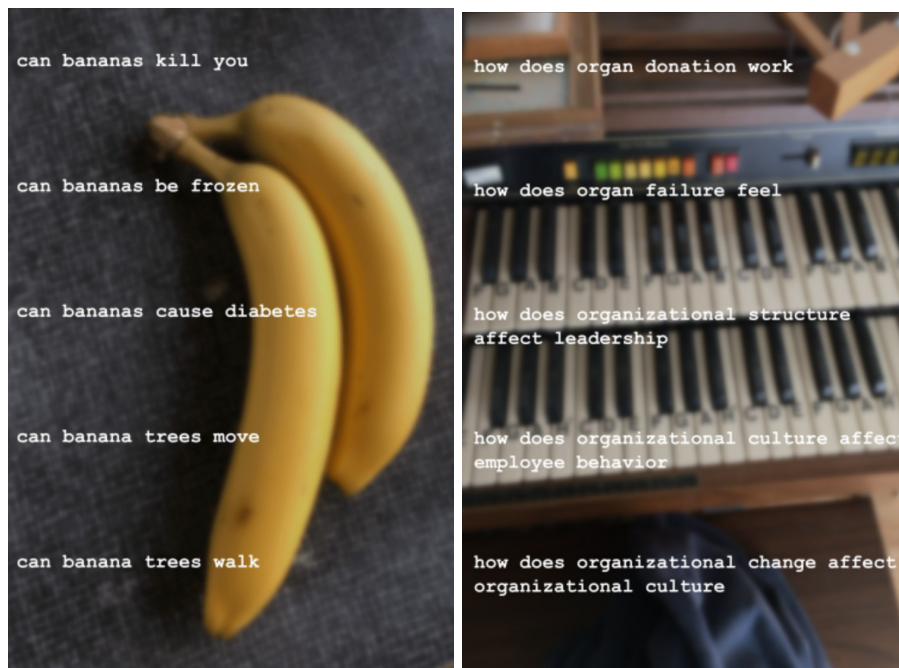


Figure 1. Example outputs from *Poem About Things* (Refsgaard, 2019)

In *Poem About Things*, Refsgaard's work (2019) builds upon an object recognition model that guesses what object is seen through the camera input. The output is slightly tweaked with the

addition of one or two words¹⁰ to create a query, which is then fed into Google Suggest API. Refsgaard adds another layer to the outputs from Google Suggest prior to getting a final poem by removing sentences that contain certain words¹¹. These words are manually selected and in doing so, Refsgaard steers the outcomes of his work.

This results in sentences that are inspired by the original image captured. Putting all this together, Refsgaard stitches the sentences into a poem and overlays it on top of the captured image, as seen in Figure 1. This work turns regular everyday objects into a poetic rendition.

Affordances & Appropriation

Two different AI components are used in this work: a built in object recognition model from ml5.js and Google Suggest API. This section explains the affordances provided by these two AI artifacts, along with their context, and how Refsgaard has appropriated it for his practice. Later in the section, I further reflect on Refsgaard's creative practice in the context of media redefinition and play.

Object recognition

Object recognition is an AI affordance that allows for machines to “see”. Based on statistics, models are trained to make an estimated guess that classifies what object is being “seen”. These technologies are often used for automating machine tasks, implementing logic based on surveillance.

The built-in object recognition model from ml5.js is MobileNet, which has been trained on 50,000 images from the ImageNet database.¹² The database contains images collected from visual search engines and hand labeled to identify 1000 categories of objects.

This affordance is often used for automating tasks by implementing logics based on surveillance. For example, by giving a car the ability to “see”, it is able to navigate the road, avoid crashing into objects, and in turn become self-driving.

¹⁰ The words from the following list are added in front of the detected object: “my”, “this”, “does”, “is my”, “does my”, “why can”, “which”, “why are”, “what”, “where”, “can”, “help”, “does”, “that”.

¹¹ Examples of words that determines if a sentence is omitted from final result: “meme”, “memes”, “lyric”, “lyrics”, “chord”, “chords”, “imdb”, “movie”, “movies”, “cast”, “quotes”, etc.

¹² <https://learn.ml5js.org/#/reference/image-classifier?id=mobilenet-data-biography>

Suggesting sentences based on aggregated collective data

Google Suggest or Autocomplete is part of Google Search functionalities that is used to provide autocomplete suggestions for Google search queries. Google Search is the world's largest library, driven by an AI system that organizes and sorts the large amount of information available on the internet to give you relevant search results. It is driven by Google's mission to "organize the world's information and make it universally accessible and useful".¹³

Google Suggest works by suggesting popular search queries. The algorithm takes into account various factors such as location, search history, and trending terms to determine the order of suggestions. Censorship measures are also in place to prevent certain controversial queries from being suggested.¹⁴

Combinatorial affordance of algorithms

The input and output nature of algorithms allows for a plug and play approach of use. So long as the media between an output and an input is compatible, algorithms can be combined with another to translate and manipulate media. The manipulated media is infused with and affected by the contexts that situate the algorithms.

Creative practice

Through his work, Refsgaard appropriates the affordances by creating his own logic. By utilizing algorithms as raw material, he is able to redefine the way it is used and make it part of a logic that drives a creative output of poetry and sensemaking of collective thoughts on certain objects.

With the initial interface for the audience being camera based, Refsgaard reappropriates the object recognition functionality from surveillance technology and data collection to lenses for poetry. This radically shifts the value from datafication, which is often associated with fast and efficient, to the poetic value of slowly looking at things from the mundane.

This work allows for audiences to playfully explore and form an understanding of AI as well. Through the camera functionality, audiences can also playfully interact with their environments as well, which provides an opportunity to obfuscate the intended use for object recognition. An object does not necessarily have to be captured by the camera, taking the AI affordance out of context. It does not matter if the object recognition functionality is able to correctly identify an

¹³ <https://www.google.com/search/howsearchworks/>

¹⁴ <https://support.google.com/websearch/answer/7368877?hl=en>

object, which brings another interesting aspect to the work: how do these machines view the objects as opposed to how humans view it. Audiences are left to wonder how well these systems are trained for recognizing the object at hand and to question the relationship between everyday objects and AI systems: How well are these objects logged or “known” in the system?

By using Google Suggest, each sentence that is produced in *Poems About Things* offers a unique perspective on the collective interests and challenges of humanity based on aggregated search queries. In this case, a tool meant for optimizing information retrieval becomes a tool of reflection and exploration of human nature.

Through computational thinking (computing literacy), Refsgaard is able to masterfully craft a new algorithm of his own, inserting his own logics: This algorithm will now give me abstract insights on what people think about a banana (through what Google Search would suggest for a phrase with banana in it). Bringing all these thoughts into one space of an image, brings control into what otherwise would be meaningless information. With this information in one space, the audience is able to draw meaning and gain insights into a normal everyday object through a different lens than they normally would.

Through Google Suggest API, the existing conventions, assumptions, and biases surrounding an everyday object are brought to light. With Google Search having been around for at least 20 years, it can be synonymous to a second brain. Whenever there is a question surrounding a topic or object, we google it. By using Google Suggest, we are accessing this log of information.

Altogether in his work, algorithmic tools allowed Refsgaard to capture everyday objects and access a collective consciousness. By using algorithms creatively outside of their usual contexts, Refsgaard turns the surveillance lens of technology into a poetic one that calls for slow, deep observations of our surroundings. A tool that is often used to optimize the process of information search is pivoted into a tool for slow looking. This also speaks to the interpretive flexibility of algorithms and how taking them out of their contexts may allow for the injection of artistic intent and agency.

Critical making: exploring generative AI tools

The critical making process with generative AI tools resulted in an audiovisual that can be found in the following link: <https://youtu.be/kHtLMA8KJ9U>.

Artifacts of conversations with ChatGPT can be found through the links below and the generated text snippets used in the audiovisual can be found in Appendices A, B, and C.

- <https://chat.openai.com/share/43329388-c659-41d0-8a4b-c182dedc8ea4>
- <https://chat.openai.com/share/dcb4ff49-b355-4753-992c-2fcea7cfe3a3>

This section contains the analysis of the audiovisual output, informing of the AI affordances provided by each tool. At the end of this section, I combine the insights with those drawn from the case study.



Figure 2. A compilation of screenshots of stills from video clips generated using Zeroscope text-to-video model on 13 July, 2023, with the prompts of “hands <action>-ing” (action verb provided by ChatGPT outputs).

Textual analysis of audiovisual

In chapter 1, the verbs (see Appendix A) were deemed by ChatGPT as “words that aim to evoke a sense of beauty, elegance, and emotion”. Even though it is uncertain upon which standards, the provided words are mostly positive in connotation, if not neutral. Some words refer to artistic activities, while some emanate a sense of gentleness, care, and lightness. The visuals for this chapter (see Figure 2) has a consistent style with sepia tones of nature — the green of tree leaves, tree bark brown, and the muted brown of dirt. For many of the clips, the background also portrays images of nature (flowers, fields, grass, forest, bushes). In the 3 seconds that each clip lasts, the movements portrayed are reflective of the verb shown. The aesthetics of the hands are as though they have been sculpted by clay. With the title of this chapter being only “hands...” a sense of curiosity is evoked as one continues to watch to see the strange verbs that are attributed to hand actions.

In chapter 2, the text is a comprehensive analysis of the human hand, pointing out its structural, functional, sensory, and cultural aspects. It is loaded with intricate details that make it seem like our hands are precisely designed. Furthermore, the hand is framed as a “tool”. The tone is very factual. These combinations most likely contributed to the visuals generated having a cold and scientific feeling (see Figure 3). The portrayal of the hand as a “tool” and “marvel of biological engineering” may have also resulted in mechanistic representations of the hand and arm. The chapter is titled “What is a hand?” This simple question provokes a factual answer. Accompanied with the generated voice, the factual tone makes this chapter feel like a documentary aiming to get its audience to marvel at the human body.

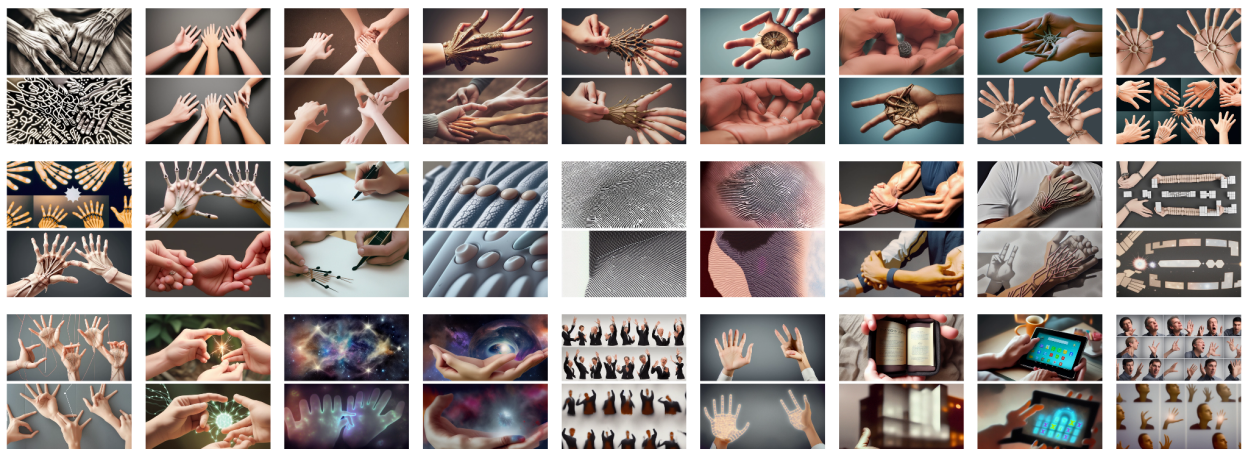


Figure 3. A compilation of beginning and end frames of clips generated using Stable Diffusion Deform via AUTOMATIC1111 WebUI, using various models from: OpenJourney v4, RealisticVision, Dreamlike Diffusion, and Deliberate v2. Prompts were inspired by text from ChatGPT (Appendix B).



Figure 4. A collage of all images (144) generated with Stable Diffusion via AUTOMATIC1111 WebUI, using various models (OpenJourney v4, RealisticVision, Dreamlike Diffusion, and Deliberate v2) with prompts of 'hand' or 'hands'. The images used in the third section of the audiovisual were taken from this set.

In the last chapter, with the form being changed to poetry, the tone of the audiovisual changes once again. Titled “an ode to hands”, this chapter emits a sense of celebration of how significant hands are for humans. Metaphors are used to paint pictures of the meaning ascribed to hands in its practicality and symbolisms of deeper human emotions and values. Read by my own human voice and accompanied with stock piano music, this amplifies the feeling of poetry, even though the poem was generated by AI. Figure 4 shows a collage of all the images generated for this part of the audiovisual, even though not all were included in the final film. From the collage, even though a lot of the hands do not correctly portray hands, elements of common stock model hand pictures are found. Most of the hands are caucasian. The hands are mostly young, no wrinkles, and some have nail polish on; these are representative of the hegemonic values portrayed by media — pretty, well put-together hands. A mix of common hand “portrait” photography styles show: black and white, plain background, and vignettes.

Overall, even though we may control the input prompts for generative AI tools, outputs may vary depending on the tools or models used. Each tool or model comes with their own perspectives, as they are trained on different datasets; thus, they each influence the outputs in different ways.

Affordances & appropriation

This analysis section is split into two parts to distinguish the affordances and appropriation for two different types of AI tools used in the process: one for text generation, another for visual synthesis.

Text generation

For this project, an exploration was done by prompting ChatGPT to get an understanding of what is collectively represented by AI on hands, by asking what a hand is, what it symbolizes, and an investigation into why AI can't draw hands and what it means for AI to be able to do so. Outputs were taken from the conversation with ChatGPT and used in creating the final audiovisual piece.

The initial affordance of ChatGPT is described in OpenAI's introduction: "We've trained a model called ChatGPT which interacts in a conversational way. The dialogue format makes it possible for ChatGPT to answer follow-up questions, admit its mistakes, challenge incorrect premises, and reject inappropriate requests."¹⁵

As ChatGPT allows artists to have a collaborator in their process of creation, what the tool affords feels like a genie in a bottle — if you only know how to ask, you can receive (albeit not necessarily always what you would like). Due to the many possible affordances, I have highlighted only the main affordances that I have benefited from as an artist using ChatGPT.

Information retrieval and cultural analysis

In exploring the theme of hands, going into conversation with ChatGPT allowed for a natural way of finding information and further inquiring about it. As opposed to Google Search, the chat builds up and is context-aware, allowing for the potential of different types of answers.

As I explored the importance of hands and the symbolisms associated with it, ChatGPT served as a capable analyst, providing me with summarized answers, oftentimes in the format of a list. The downside to this is the lack of critical thinking I needed to do to seek the answer, as ChatGPT has provided for me what is essentially a broad and concise answer through the patterns and knowledge it has extracted from its training data. Nevertheless, conversing with it allowed me to make sense of the theme and draw meaning around the topic as I would with a sparring partner. Through my conversation with ChatGPT, I was able to develop a concept for the audiovisual.

Brainstorming and content creation

In concept development, ChatGPT's ability to generate lists makes it a great brainstorming tool. For the first part of the audiovisual, I knew I wanted to depict hands in actions, to brainstorm the action words, I had asked ChatGPT to generate a list of poetic words (see example in Figure 5

¹⁵ <https://openai.com/blog/chatgpt>

below). This list is derived from literary sources from its training data with poetic or symbolic context. Although, it is unclear based on what criteria and values the numbered list ranks the given words.



Give me a list of poetic words of actions that can be done with hands



Certainly! Here's a list of poetic words describing actions that can be done with hands:

1. Caress
2. Embrace
3. Grace
4. Weave
5. Enchant
6. Sculpt
7. Illuminate
8. Enfold
9. Blossom
10. Whisper

Figure 5. A snippet of the prompt that was used to brainstorm a list of actions for the first part of the audiovisual.¹⁶

ChatGPT's ability to generate textual content allows for a quick production of material that can be used in my work. With the generated content, as ChatGPT has been trained on internet data, it also represents a collective awareness of the Internet (albeit one biased towards hegemonic values). With its ability to generate content in different formats, from lists to paragraphs to poems, ChatGPT is a versatile tool.

Similarly to how Refsgaard uses Google Suggest to provide a poetic lens on ordinary objects, I utilized the generated content to provide a lens on hands in different manners. The first chapter of the audiovisual uses poetic action words to explore the beautiful ways our hands can move. The second chapter uses ChatGPT's description of a hand to highlight the intricateness of our hands. The third chapter uses a generated poem to alternatively explore the significance of hands.

Apart from answering questions and rejecting inappropriate requests, I have appropriated ChatGPT into a creative collaborator that helps to reflect our own culture back at us. Even though the outputs from ChatGPT are just answers to questions, driven by a technological

¹⁶ For full conversation: <https://chat.openai.com/share/43329388-c659-41d0-8a4b-c182dedc8ea4>

culture driven by data and information, by utilizing it in my audiovisual, I appropriate the outputs into reflective content.

Visual synthesis

For generating visuals, I used Zeroscope¹⁷ and Stable Diffusion¹⁸, as well as Stable Diffusion plugin for videos called Deforum¹⁹. For videos Zeroscope provided a simple input-output for text to video, while Stable Diffusion Deforum allowed for more control in creating abstract visuals. For visual synthesis, Stable Diffusion also provides more options in models that can be used, each trained on different visual datasets.

Below are the affordances provided by the visual synthesis tools within the context of generating hands as an object and abstract visuals relating to it.

AI understanding and collective consciousness

By simply inputting a prompt text, the tools would generate visual content. By itself, the output represents a collective consciousness of visual culture. Depending on the model, the “perspective” changes, based on the image dataset from which it was trained upon. Each model can be considered to have its own set of embodied cultural values.

Through prompting, I have been able to explore the relationship between the input words and the output visuals in different models. For the first and third chapter of the audiovisual, similar prompt formats are kept for each of the visuals. With Zeroscope, the prompt was “hands” followed by the poetic action word given by ChatGPT. The outputs provided an interesting exploration into how AI interprets the action — what sort of motion the hand makes, what type of labor or activity is associated with each action, what types of hands are performing the action (skin tone, amount of wrinkles, whether if it is wearing a ring or a watch). With Stable Diffusion, by maintaining the same prompt of “hand” and “hands” across different models, I am able to tap into different perspectives as though I have different visual artists on my team. But how much does each perspective actually differ from one another? Most of the hands generated are often light in skin tone with nicely-done nails, showing that the models must have been trained on images of hands with a certain beauty standard. The visual outputs from the AI tools allow for reflections of our own imaginaries for how AI interprets the given input prompts, while also exploring a collective consciousness that is represented by each model.

Control of visual synthesis and perspective

For Zeroscope, there is not much control beyond the input, without getting into the code and running the model on your own machine. By using it as a no-code tool, the most meaningful human control is in choosing to use the output or to discard and generate a new visual.

¹⁷ <https://huggingface.co/spaces/ffloni/zeroscope>

¹⁸ <https://github.com/AUTOMATIC1111/stable-diffusion-webui>

¹⁹ <https://github.com/deforum-art/sd-webui-deforum>

For Stable Diffusion, there are more control options available. For the simplicity of this research, most of the settings are kept as is. The affordances used for controlling output for Stable Diffusion still images are: prompting, output size (width and height), model, and batch count. Prompting is the input in text format that drives the visual. The output size determines the format in terms of size of the output. The model determines the aesthetics. The batch count determines how many different outputs are generated in one go. For Stable Diffusion Deforum, the affordances utilized are: prompting, output size (width and height), model, and number of frames. The number of frames determine how long the animation lasts. For prompting for Deforum, the tool allows for multiple prompts from which the model will fluidly combine the images into an animation (see example below).

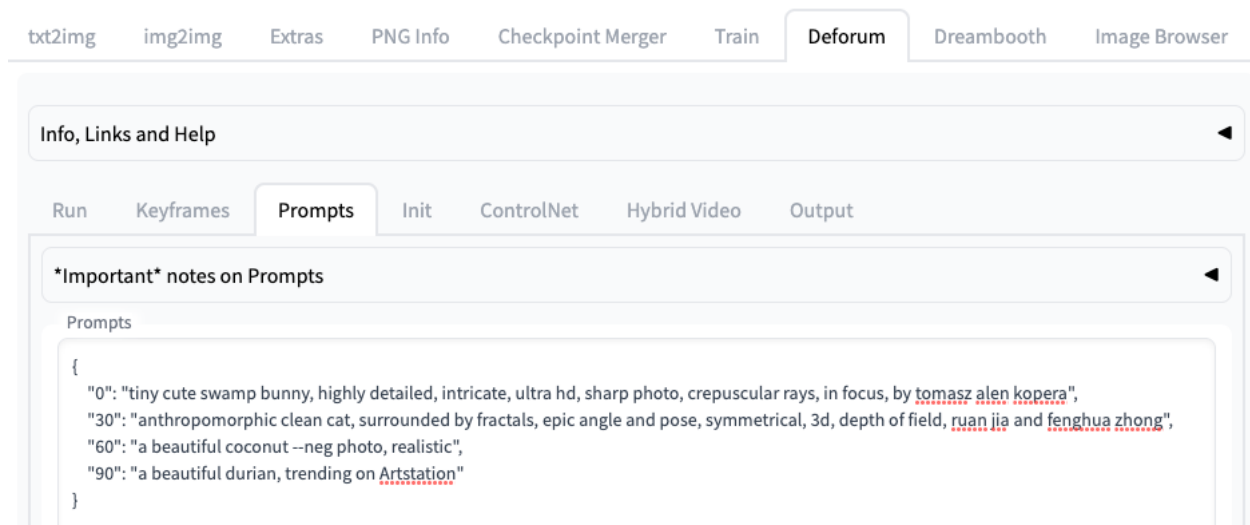


Figure 6. Base example of prompting with Stable Diffusion Deforum.²⁰

Through prompting and in selecting a model to generate visual content, I am able to influence the output, injecting it with my own artistic intention and vision. Similar to how I have appropriated text content from ChatGPT, by combining the outputs from these tools with other generated materials, I appropriate by adding another layer of meaning to the content. Despite the added layer of meaning, it is important to note that the embodied values from the tools still remain and can still be evident in the output.

From algorithmic tools to generative AI tools

Through my critical making process, I have identified some key starting points and questions of considerations to guide creative practices in reappropriating algorithms and AI tools, shifting the focus away from bias and discrimination to resistance and expression. These points are also informed by insights from the case study of Andreas Refsgaard use of algorithms.

²⁰ The numbers signify the frame number and the text that follows is the prompt. It is also possible to input negative and positive prompts, which allows for control in what may or may not be in the output.

First of all, it is important to be aware of the bias that comes with the tool that is being worked with. This can be done by understanding the data it has been trained on and noticing patterns in the outputs. On a holistic level, understanding where the tool comes from in terms of the parties that have developed it can also help to inform the bias and engrained values of the tool. What was it originally designed for and what values shape its design?

With neoliberal practices promoting efficiency, generative and automation tools thrive and provide us with a convenience that allows for the mundane to be overlooked. By using these tools as a lens to look at the ordinary aspects of life, we turn them into tools of poetry. While poetry may have varied interpretations, its core essence lies in valuing aesthetics and imagination, making it a powerful tool for counterculture. Furthermore, this can be combined with finding weaknesses in AI systems and highlighting the pitfalls to create a juxtaposition that opens up room for reflection and discussion. Where are these tools most vulnerable? Where is the tension between what these tools are capable/incapable of and the existing issues or overlooked poetry?

Through reappropriation, either with novel combinatorial approach of use or by utilizing these tools as a medium to explore slow and seemingly trivial subjects, we can repurpose these tools from agents of discrimination to vehicles of thoughtful expression. This act of resistance challenges the hegemonic cultural norms and values, compelling us to imagine alternative modes of living and seeing. By doing so, we bring attention back to the tender facets of humanity that may have been overshadowed or underappreciated. This act of reappropriation harnesses the power of generative and automation tools as catalysts for creativity and transformation, contributing to a more profound understanding of the human experience.

Despite the inherent nature of discrimination, algorithmic tools are a great tool for reflection. Rather than being just a medium for content generation, they can also be a medium for reflection and critique of culture. With an open-ended, input/output mode of interaction, along with the lack of transparency in how it works or what it has been trained on, there is a degree of esotericism in these tools. This esoteric nature makes it an interesting tool to play with, especially when exploring abstract themes. Creative practices that utilize this essence of AI must remain open to seeing what it brings up and to work with what comes up. But this is not the divine - these tools can only reflect based on what it has been designed upon and what it reflects are issues that already exist in the world. The open-ended nature allows for these tools to be reappropriated in many ways. The question is how can we work with what is there? What issues can we bring to light or amplify in awareness with these tools?

The input/output disposition of AI models allow for a combinatorial plug and play approach of use. By viewing them as material, they can be combined in our own algorithm like lego blocks. Through artistic intention and vision, our own set of rules can be defined and these tools can be used to support our process in crafting stories. As we learn which tools/models embody which cultural values, we develop our algorithmic literacy and are able to wisely choose tools/models to benefit how we frame our work. In creating new 'algorithms' or bringing them into our set of

rules we appropriate them for our context and create counter-algorithms. Through appropriation and putting these tools in different contexts, we are able to redefine the narratives that are being amplified by these tools.

The algorithmic reimagination

As seen in the previous sections, critical making centered around AI has the potential to redefine and shift embedded values in algorithmic tools. A key component identified from these practices is algorithmic reimagination — the ability to reimagine the uses of algorithms. When playfully approached, imagined affordances of algorithms may provide opportunities for inserting agency. Through reappropriating and reframing imaginaries, the reclamation of human agency provides a low-threshold pathway for algorithmic resistance. In this last analysis part of this thesis, I come back to develop the introduced notion of algorithmic reimagination, informed by previous academic studies, case study analysis, and critical making.

The algorithmic reimagination is a playful act of reimagining new purposes for algorithmic tools. This purpose could be to counter the existing algorithmic bias and oppression (algorithmic antagonism), to come up with a novel approach of use and create new narratives for how algorithms may be deployed, or to use algorithmic tools to explore new algorithmic futures. The algorithmic reimagination is about rethinking what algorithms are and how they can be utilized or reappropriated. It is about reimagining the powers that we can wield with algorithms; the agency in reimagining the roles algorithms play in our societal structures. This is a skill and a mentality. In the sections below discuss the ways in which one can engage with reimagination and the attitudes that form it.

Approaches of reimagination

The different purpose in reimagining means there are different approaches to it. Whatever the approach of reimagining, to engage in algorithmic reimagination is a political act, whether the actor is conscious of it or not. Different approaches vary in degree of political action and are entailed below. These typologies are inspired by the frameworks described in the theoretical framework.

Algorithmic antagonism

Algorithmic antagonism, as described by Heemsbergen et al. and Pöttsch & Pereira (2022), involves reconfiguring algorithms as a form of direct political resistance. Algorithmic reimagination in this domain remains close to the current context and uses art and creative interventions as a way to resist, challenge, and subvert the dominant ways that algorithms are used for governance or decision-making in our datafied society. Within algorithmic antagonism, artists challenge the established norms by appropriating, rejecting, inverting, or creating

alternative ways of using algorithms. By doing so, algorithmic antagonism seeks to reassert human agency and control in the increasingly complex technical systems that govern our lives.

Out-of-context appropriation (system)

This approach brings algorithms as tools out of its existing context. By doing so, we see the oppositional affordances proposed by Milioni & Papa (2022), which arise from unexpected, unintended, or 'incorrect' uses of affordances. These may directly or indirectly be a form of political resistance. Bringing algorithms out of its context, whether pointless or poetic, allows for a redefinition of how they are used and how they impact society. If the work is pointless, a political statement remains in going against the algorithmic culture of datafication and the values of optimization, efficiency, and labor from neo-capitalism. In poetic approaches, similarly to the case study and critical making shown in this study, algorithms are reimagined as lenses for deepening reflection and experience of what it means to be human. It is important to note that this approach tackles algorithms at the system level, unlike the next approach which focuses more on the user's abstract imagination.

Reimagining narratives (culture)

Beyond the workings of a tool, the algorithmic reimagination can also apply to the reimagination of the society that we are embedded in. This approach is in the language we use and the stories we tell. Through questioning, we can impose new frameworks for exploring new and alternative algorithmic futures. By developing hopeful narratives of algorithms and reimagining the ways they exist in our society, we build new pathways for coexisting harmoniously with algorithms and one another.

Attitudes of reimagination

No matter the approach taken for reimagination, there are certain attitudes that allow for it to occur. Based on literature studies, case study examination, and critical making, I have identified these traits to be important factors that allow for this algorithmic reimagination to take place: hopeful, playful, resourceful, and daringly inquisitive.

At the root of the notion is a desire to step out of dominant logics and to shift the narrative and impact of algorithms from discrimination to liberation. In order to be able to imagine futures where algorithms can be tools of liberation, one must be hopeful. Without hope, imagination would lean towards dystopian scenarios, which provides no actionable paths towards resistance or change.

Being rooted in play, the algorithmic reimagination provides a ground for expression, appropriation, and political action. Through play, boundaries are tested and new playgrounds are created for embedding algorithms in sociocultural environments. Actors engaging in algorithmic reimagination are able to infuse new algorithmic contexts with their own hopeful values as appropriative play allows for novel approaches to working and living with algorithms.

Just as play is political, the algorithmic reimagination is a political act that defies the current mainstream nature of algorithms and attempts to counteract and redefine the values of algorithmic systems and its role in society and culture.

To playfully reimagine, one must be resourceful. By viewing algorithms and its outputs as raw materials, working with algorithms becomes more actionable. As AI is able to 'imagine', how can we reimagine its way of working or its imaginations? Meanwhile, it is important to recognize that this is not a material to capitalize upon for monetary gain. By viewing it as creative material, we must also not forget that these algorithms are not necessarily static and have a complex nature that may allow them to act as agents within a system. This resourcefulness doesn't apply to just algorithms on a material level, but also to existing sociotechnical imaginaries. The 're-' preceding imagination signifies the presence of already existing imaginaries that one can utilize and reappropriate.

The algorithmic reimagination is an inquisitive step towards building a just and equitable society. From this inquiry comes an actionable pathway, beyond going in loops about issues caused by algorithms.

Degree of technical understanding

As the algorithmic reimagination is a skill and attitude, one may ask how much technical understanding of algorithms is needed. Similarly to how the algorithmic imaginary does not necessarily demand a correct understanding of the technical aspects of how algorithms work, the algorithmic reimagination is not solely dependent on digital literacy. Although, some manners of reimagining may call for a technical understanding, more specifically for algorithmic antagonism. Having a deeper understanding of the technicalities may aid in one's reimagination and the impact thereof. A large part of the algorithmic reimagination relies on an experiential understanding of how algorithms work and how we may understand the workings of AI through its reflective and esoteric nature. Algorithmic reimagination may also be a low-barrier entry to gaining deeper technical understanding.

With a lot of accessible AI tools having roots in big tech platforms, we are often encountered with "the master's tools" that are embedded with dominant cultural values. Nevertheless, approaches and attitudes of algorithmic reimagination provide pathways for resisting algorithmic dominance. Just like a skill, when fully embraced and exercised often, one can become more adept at the practice of reimagination. Without being reliant on technical knowledge of AI, people at various digital, data, and algorithmic literacy levels are given an entrypoint to reclaim their agency in this age of algorithms. From the simplest entrypoint, people are able to challenge and reappropriate dominant sociotechnical imaginaries.

Conclusion

In this final chapter, I summarize the key findings from my research and discuss implications around the methodology taken. Suggestions for future research are noted before ending with closing remarks.

Summary of key findings

To summarize this research, I highlight the key AI affordances I've noted from my analysis.

AI affordances

With a case study of Andreas Refsgaard's work rooted in creative coding and the creation of an audiovisual with critical making, I have identified affordances of algorithmic tools and analyzed how they allow for playful reappropriation. There are two general affordances that provide opportunity for creative practices to transform algorithms from tools of discrimination to tools of liberation. These are the combinatorial affordance and the reflective capabilities of algorithms (representing sets of collective consciousness and perspectives). Other affordances differ based on specific algorithm / algorithmic tools. Some examples of these affordances are, but not limited to, object recognition, information retrieval, cultural analysis, and content generation.

The black box nature of AI provides a game-like environment through which creative reappropriation of algorithms can be studied and explored through play. The link between the input and the output is dynamic. To play with AI is like testing the boundaries of a quasi-game and can be done by feeding in specific types of input in order to explore outputs. The combinatorial nature allows for algorithms to be thrown in different contexts in which artists can create their own logic, which can influence the final outputs and redefine the values that exist in algorithms.

The ways in which algorithms represent a collective consciousness, based on training data, makes it an interesting tool for reflecting societal issues. Similar to the role of the artist in reflecting societal issues, AI's ability to do so, unintentionally, makes it a powerful tool for the artist to wield. With different AI models, artists are given tools to play around with perspectives, albeit many of them are engrained with hegemonic values.

Creative appropriation

As seen in this study, media redefinition and play are key ingredients that allow for the reshaping of embedded values in technological tools. The work done in this study has resulted in some key insights for creatively appropriating and using algorithms in a creative practice.

This starts from viewing AI as a raw creative material. As raw material meaning unfinished, this means algorithms and its outputs can still be used for something else. Meaning is not fixed and can be changed through appropriation.

To be able to appropriate algorithms, it is important to be aware of the initial intention of the algorithm or tools. By understanding what it was made for/from and the values and principles it is derived from, allows for a better understanding of its bias and nature of discrimination. An understanding of the starting point of the tool also allows for better positioning of creative tension that can be explored.

With juxtaposition as a device, generative and automation tools can be used to look at the ordinary aspects of life and find weaknesses in AI systems. This opens a pathway to appropriation that turns tools of discrimination to mediums of thoughtful reflection and discussion, challenging the embodied cultural values of the tool. Through tools of poetry, algorithms can be harnessed to provide a deeper understanding of the human experience.

The notion of algorithmic reimagination

This leads to the development of the notion of algorithmic reimagination, which is built upon existing theories in digital humanities. The algorithmic reimagination is a key component to how creative practices can be used to transform algorithms from tools of algorithmic control to tools of liberation.

The algorithmic reimagination is a powerful skill and attitude for engaging with the implications of algorithms in society. It involves reimagining new purposes for algorithmic tools and rethinking the roles algorithms play in society. Three different approaches for reimagining are identified: algorithmic antagonism, out-of-context appropriation, and reimagining narratives. Each of these vary in the degree of political action, but engaging in algorithmic reimagination is already a political act, as one attempts to shift the nature of algorithms away from its inherent values rooted in datafication and efficiency. The attitudes associated with the algorithmic reimagination are characterized by hopefulness, playfulness, resourcefulness, and daring curiosity. Reimagining does not necessarily require a deep technical understanding of algorithms and can even be a pathway that leads to the development of algorithmic literacy. Ultimately, the algorithmic reimagination aims to challenge the dominant logics of algorithms and redefine their role in society, leading to a more just and equitable future.

Methodological review

With an exploratory research question, the combination of affordance analysis and critical making as methods allowed for a versatile and broad exploration that generated valuable insights. Affordance analysis on the case study provides an outside-in approach to understanding algorithmic tools, while critical making provides an inside-out approach. Even though the broad setup of the research question made the research vulnerable to lack of depth in analysis, it allowed for what was important to arise, from which I have been able to grasp the

key findings. This is further complemented by the use of affordance analysis, which is a simple and efficient method. With different algorithms and algorithmic tools providing vastly different types of affordances, I only needed to identify the affordances that capture the essence of algorithms and algorithmic tools in general. By exploring both

For studying the appropriation of algorithms and creative practice, affordance analysis is a well-suited method. Modes of interaction and context of use is taken into account while cultural and social factors and embedded values and meanings can be explored.

The addition of critical making as a method further strengthens the findings. As this study explores the creative potential of algorithms, critical making becomes a suitable way to engage with it on a material level. The critical making aspect of turning matter of fact to matter of concern puts the technology/tool up for dissection to understand the embodied cultural values and its implications on society and culture.

The most challenging aspect of this study is in combining all the different theories from different disciplines, while also having a broad subject to dissect and analyze. The interdisciplinary nature of critical making was beneficial for this. With the fluidity of the method, it could have been better informed by including other techniques as well, such as textual analysis on the generated visuals. As critical making is more commonly found in design research, I hope that the use of the method in this study can be proof of its value in informing theory in digital humanities research.

A possible weakness in this research is the lack of specification in the types of algorithmic tools studied. Focusing on a particular type of tool, rather than a combination of AI models and generative AI tools, might have been beneficial for the focus of the study. Nevertheless, the combination of the types of tools (across different platforms and types) allowed for a broad overview for this exploratory study.

It is also important to note that the outcomes of this research may also have been heavily dependent on the choice of case study and the positioning of the critical making assignment. Had I chosen to analyze a different case study or positioned the critical making assignment and process differently, I could have had different results. Nevertheless, I've tried to capture affordances that are general to AI capabilities. Furthermore, my engagement with generative AI tools was on a very basic level and no coding was necessary. This allowed me to engage more with imaginaries, which is a core element of this research. In the following subsection, I would like to discuss further on the implications of generative AI tools.

Implications of generative AI tools

Even though generative AI tools may allow for artistic visions to be implemented faster, their embodied values can have implications. As tools can be a cultural carrier, these tools may

further perpetuate hegemonic values. Despite the anthropocentric²¹ safeguards these tools have in place at the time of writing, it is important to be aware of the implications of these tools on society.

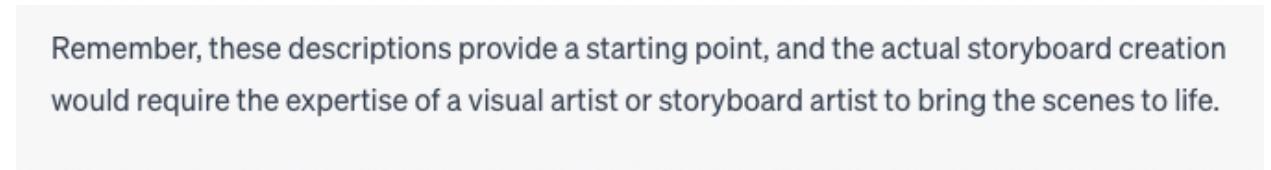
Both text and visual generation tools can be considered cultural agents embedded with their own sets of values and perspectives. Although, the manner of interaction with the tools and their degree of human-likeness may influence the degree of impact on our own internal thought processes (for either artist or audience).

Due to the conversational nature of interaction, ChatGPT not only allows for intuitive manners of looking up information, but it can also be considered an agent in knowledge and cultural production. The matter of concern surrounding AI personal assistant technologies is if we are interacting with it like a regular person, what kind of “person” are we talking to? What are the values upheld by this “person” and how does that then affect us as users?

At the time of this study, ChatGPT is trained on text databases from the Internet up to September 2021. This means that the cultural values and perspectives are based on information that has been put online until that date is engrained in the model. This is a reflection of the hegemonic knowledge and values that are available on the internet. Similar arguments can be made for generative visual models.

As these tools are used, the embodied cultural values may still show in end products, even after appropriation to a different context. For example, the lack of diversity in skin tone of hands generated in Stable Diffusion. Though not necessarily applicable for this case, the beauty values and unrealistic standards that are derived from training data may be further promoted. Even though it is possible to select models which influence the outcome, there is a lack of available options that allow for counter cultural narratives or representations.

For ChatGPT, the platform has safeguards in place that may be considered pro-anthropocene²². Responses are masked as neutral and often state that as an AI language model it does not have opinions and that information provided is based on training data. When asked to create a storyboard, it provides a starting point and advises for human expertise for creation (see Figure 7).



Remember, these descriptions provide a starting point, and the actual storyboard creation would require the expertise of a visual artist or storyboard artist to bring the scenes to life.

Figure 7. *ChatGPT’s response when prompted to create a storyboard.*

²¹ The safeguards took into account the fear-based narratives that humans may have towards AI. This resulted in responses that often praised human abilities or remained kumbaya around strong opinions.

²² Based on initial prompting (without prior prompts to direct ChatGPT towards certain roles or functions)

For the critical making assignment, the results of describing a hand or writing a poem about it seems to glorify humans and our ability to connect and make; although this may also be a reflection of the training data and speaks more to our human ego in the stories we tell.

Suggestions for further research

As previously suggested, the research may benefit from more specific study of similar nature into different types of algorithmic tools from different levels of models, algorithms, and platforms. As generative AI continues to progress, further studies in the affordance of other types of generative AI and its different formats of translation, such as text-to-speech or text-to-3d-models, may be interesting.

As we talk of tools of liberation, further research may benefit by drawing from gender studies and black feminist liberation theories. Continuing to build off of Audre Lorde's thesis of "the master's tools will never dismantle the master's house," the "house" that we are in could be better defined in the context of the algorithmic culture. By doing so, we can find a way to define the "tools" we are using in a way that captures its essence, so that even when the tools continue to change and develop over time (which happens rapidly in the case of AI tools), it will still remain relevant. By not getting caught in a cat and mouse chase in constantly defining the tools, we can look more deeply at the different layers in which these technologies grip our lives.

To build upon this research, the notion of algorithmic reimagination may be developed further. This could be done through pedagogical developments and linking it to notions of algorithmic literacy. Theoretical developments to strengthen this as a practice-based concept with imagination as agency may also be beneficial.

Final remarks

With the spirit of play, as people engage with algorithmic tools, they have the power to disrupt the status quo and redefine how such tools should be used. Through this act of agency, they are defining and possibly redefining the functionalities of the tools and giving it a purpose and embedding meaning into generated outputs. This expands the algorithmic imaginary; hence, the algorithmic reimagination. In the algorithmic reimagination, humans and machines are coming together to push the limits of what is possible with algorithmic machines, highlighting the epitome of human creativity. Even though the algorithmic imaginary is driven forward by technological progress, the algorithmic reimagination further expands the imaginary of what algorithms and algorithmic tools are capable of. Through reimaginings of what once was by utilizing present capabilities, the possibilities of what an algorithmic tool can do is enhanced. By exploring the use of existing functionalities outside their scope of design, new futures can be imagined or new layers can be added to already existing imaginaries.

This reimagination is a frame of mind as well as an act of play. The algorithmic reimagination utilizes both the past and the future in order to push the limitations of what exists in the present. It is a balance that is found when the playful and curious nature of humanity intertwines with the systemic workings of computational machines. This is the harmonious ensemble of man and machine that can propel us into inclusive and empowered futures.

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Appendix A: ChatGPT output 1

Output from ChatGPT with given prompt: Give me a list of poetic words of actions that can be done with hands.

Certainly! Here's a list of poetic words describing actions that can be done with hands:

1. Caress
2. Embrace
3. Grace
4. Weave
5. Enchant
6. Sculpt
7. Illuminate
8. Enfold
9. Blossom
10. Whisper
11. Paint
12. Unite
13. Illuminate
14. Resonate
15. Dance
16. Quiver
17. Tangle
18. Serenade
19. Create
20. Conjure
21. Glide
22. Traverse
23. Reverberate
24. Adorn
25. Stargaze

These words aim to evoke a sense of beauty, elegance, and emotion when describing the actions performed by hands.

Appendix B: ChatGPT output 2

Output from ChatGPT with given prompt: Describe a hand

A hand is a remarkable and intricate appendage found at the end of each arm in humans and many other animals. It serves as a primary tool for interaction with the world, allowing us to grasp, touch, manipulate, and explore our surroundings.

Typically consisting of four fingers and a thumb, a hand possesses a complex structure of bones, muscles, tendons, ligaments, and nerves. The skeletal framework of the hand includes the carpals, metacarpals, and phalanges. The carpals form the wrist, connecting the hand to the forearm, while the metacarpals are the long bones that make up the palm. The fingers, attached to the metacarpals, contain three phalanges each, except for the thumb, which has two.

The hand's versatility is mainly due to the opposing movement of the thumb, which can rotate, pivot, and touch each of the fingers. This unique feature enables precise and delicate actions, such as writing, painting, playing musical instruments, or performing intricate tasks.

The skin of the hand covers the underlying structures, providing a protective barrier and a sense of touch. It is rich in sensory receptors, allowing us to perceive textures, temperatures, and pressures. The fingertips, in particular, are highly sensitive, making them crucial for tasks requiring fine motor skills.

The muscles and tendons in the hand work together to produce a wide range of movements. The muscles, located in the forearm, send tendons through the wrist and palm, which attach to the bones of the hand. These tendons act like strings, allowing the muscles to control the movement of the fingers and thumb.

The hand's dexterity and coordination are supported by an extensive network of nerves. The median nerve, ulnar nerve, and radial nerve supply sensation and motor control to different regions of the hand. These nerves facilitate our ability to feel and respond to stimuli, allowing for intricate gestures and precise manipulation.

Beyond its functional aspects, the hand plays a significant role in human communication and expression. Through gestures, we can convey emotions, signals, and messages, making the hand an essential component of nonverbal communication.

In summary, a hand is a marvel of biological engineering, enabling humans to interact with the world through its intricate structure, precise movements, tactile sensitivity, and communicative capabilities.

Appendix C: ChatGPT output 3

Output from ChatGPT with given prompt: Write a poem about hands

In the realm of touch and tender grace,
Reside hands that leave a lasting trace.
Silent storytellers, in every line and crease,
They hold within secrets and moments of peace.

With strength and purpose, they shape the world,
From fingertips delicate, their wonders unfurled.
Craftsmen of dreams, creators of art,
Hands bear the imprints of a passionate heart.

In the embrace of a lover's gentle touch,
Hands whisper of affection that means so much.
They intertwine, fingers finding their place,
A dance of connection, a tender embrace.

Hands extend in friendship, in unity and care,
A helping touch, the burdens they share.
They hold, they comfort, wipe away tears,
Conveying solace in the darkest of years.

In the realm of giving, hands offer their part,
Generosity flowing from a compassionate heart.
They reach out to those in need, a guiding light,
Lifting spirits, illuminating the darkest night.

From the stroke of a brush upon a canvas grand,
To the melodies crafted by a musician's hand,
Hands ignite the world with artistic fire,
Conveying emotions, passions that inspire.

With hands, we build bridges and tear down walls,
Writing history's pages, answering destiny's calls.
Guiding and protecting, they defend what's right,
Upholding justice, striving for a world alight.

So let us celebrate these remarkable lands,
Honoring their power, the wonders they command.
For in hands, we find the essence of our race,
An embodiment of love, resilience, and grace.