No Replica
An Aesthetics of the Performative for Automata

by

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Abstract

What is the role of technology in performance? How can technology stretch the realm of performance beyond an actor-spectator dichotomy? This paper investigates the ability for computational media, or automata, to generate meaning in performance beyond the (re)production of media content.
I. INTRODUCTION

The semantics of referring to Tristan Perich’s *1-Bit Symphony* are unclear. In terms of its materiality, the piece is an electronic circuit that produces an audio output when connected to a power source. Completing the circuit with a battery, as well as attaching a speaker, subsequently (re)produces a musical composition. However, Perich complicates *1-Bit Symphony’s* relationship to its immateriality (i.e. its encoded composition) by stating the work “performs” said music when turned on.¹

![Fig. 1. Tristan Perich’s 1-Bit Symphony. 2010, 1bitsymphony.com.](image)

Perich’s portfolio contains a wealth of similar pieces aimed at disrupting the assumption that musical performance is exclusive to humans. Another piece, *Surface Image*, is an intersection between human and digital performance in which pianist Vicky Chow accompanies forty 1-bit electronics (similar to the circuit present in *1-Bit Symphony*)—or perhaps, forty 1-bit electronics accompany the pianist. Whereas a listener–spectator

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¹ Description from Perich’s personal website on the project, 1bitsymphony.com.
might reduce the technology as a means of strictly reproducing other media, Perich attempts to elucidate the physical, or material, properties at play in the technology as its own medium, media object, and performance with the capability of producing new content and meaning.

The tension in these works derives from the ambiguity between notions of production and reproduction of media content. The aforementioned uncertainty regarding 1-Bit Symphony’s semantics similarly results from the ambiguity inherent in how the piece operates. It is unclear whether the electronic circuit simply repeats its encoded composition as a form of recorded media, or if it dynamically creates (or “performs”) the piece generatively. It is clear that the piece is identical each time the circuit (re)produces it, but the same could be said for Vicky Chow’s (re)production of a piano score in Surface Image, albeit to a lesser degree of precision in the latter case. Nevertheless, both Chow and the circuit read some kind of a musical score and “play” an “instrument” to (re)produce said score.
As is likely clear by now, abstracting performance to a non-human entity requires extensive reevaluation of assumed definitions. Comparing a pianist to an electronic circuit challenges the nature of performance such that terminologies fall apart. Is a speaker an instrument, and if so, can a 1-bit electronic (or any digital audio source) be a performer? If not, what prevents a non-human entity from having the capacity to perform? Is performance of a score, script, or other form of transcription an act of production or reproduction? And, who gets to make these distinctions?

It is debatable as to which side of the dichotomy between production and reception has the authority to generate meaning for art. Technology for reproducing art complicates this debate by altering the role of the artist in each instantiation of their work. Digital media such as video games causes further uncertainty as the art itself becomes reproducible by the nature of its creation. Future developments rapidly approach an era in which the production of art can occur without any human intervention through the use of artificial intelligence. Therefore, it is productive to remark that meaning in these cases emerges from audience reception since the role of the artist becomes ever more obscure.

This conclusion implies that an audience’s creation of meaning does not necessarily interact with an artist’s intent or even acknowledge the artist’s role in the emergence of meaning. This is in contrast to Stuart Hall’s

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2 Benjamin, 24-5. “To an ever-increasing degree, the work reproduced becomes the reproduction of a work designed for reproducibility... to ask for the ‘authentic’ print makes no sense.”
concept of encoding and decoding a media object, wherein the audience directly engages with some aspect of the artist’s ego.\(^3\) Instead, the audience’s relationship to meaning and content is closer to Marshall McLuhan’s famous phrase, “the medium is the message,” in which the presentation of the work becomes its own artistic entity.\(^4\)

Returning to *1-Bit Symphony*, Perich empowers the audience to engage with the work as its own medium, media object, and performance. His description of the electronic circuit as a “performer” moves the onus of the work to the object itself. Furthermore, his decision to enclose the circuit in a standard CD jewel case and sell copies of the piece dispels the notion of authenticity in art and performance. By focusing on 1-bit electronics, which are the elemental units of audio (re)production,\(^5\) he also attempts to disillusions listener-spectators about how said technology operates to combat the mystification of technology in popular culture. Combined, these efforts create a dichotomy between the audience and the media object instead of the audience and the original artist.

How does the audience then generate meaning from the media object? Questions regarding an object’s ability to perform remain

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\(^3\) For more information on the encoding/decoding communication model and an introduction to reception theory, see Hall’s 1973 essay, “Encoding and Decoding in the Television Discourse”.

\(^4\) McLuhan discusses this concept extensively in the first chapter of *Understanding Media: The Extensions of Man*.

\(^5\) The technical details regarding 1-bit circuits exceed the scope of this paper. For more information on the technical and historical context of 1-bit audio, see McAlpine.
outstanding, and a listener-spectator must now reconcile the object’s materiality (i.e. medium) and immateriality (i.e. content) to make sense of the resulting experience. For 1-Bit Symphony, one’s experience involves listening to the music content but also considering how the electronic circuit generates said content. The oscillation between perceiving the object’s materiality and immateriality has the potential to generate new meaning beyond the media object’s respective parts.

To use McLuhan’s terms, the medium’s relation to its content is the message. Oscillations in perception between materiality and immateriality have the ability to generate unique meaning and enact forms of performance that extend beyond human actors. This discussion breaks the actor-spectator dichotomy since media objects do not operate under the same principles as human actors do. It is therefore necessary to develop a new cross-disciplinary aesthetics to describe the meaning that emerges from oscillations in perception. In this paper, I expand theories of performance and performativity to account for the (re)production of media and subsequently develop an aesthetics of the performative for computational media, or automata.

In partial completion of this research project, I devised a sound performance titled No Replica. The shared name between the performance No Replica and this paper represents my effort to disassociate automata from its use to replicate human subjects and actions. Instead, I propose that an aesthetics of the performative for automata operates under a
distinctive set of assumptions that differentiates it from other forms of performance. The latter portion of this paper involves a case study of the sound performance *No Replica*, as well as a comparative analysis of the video games *The Witness* and *Baba Is You*. 
II. AN AESTHETICS OF THE PERFORMATIVE FOR AUTOMATA

This chapter and its associated subsections cover a broad set of theories across several disciplinary fields. I place various concepts in relation to each other from these fields, and as such I frequently reference previously defined terms. I have included a glossary of key definitions at the end of this paper for reference if ever necessary.

Mediatization

“Live” television poses a dilemma: while onscreen events supposedly occur simultaneously to their televised counterparts, the projected images can only attempt to reproduce the events. What, then, does “live” really mean in this context? The nature of performance, wherein only the original event can exist within that specific space, time, and community, directly contradicts the presupposed narrative of said broadcasts—they are more akin to replications. However, the immediacy of “live” television and comparable experiences is currently under contention as more of them place greater value on their digital counterparts.

Live (not in the televised sense) and digital experiences are often reduced to a dichotomy, but contemporary developments reveal a more complex picture. Technologies like video games offer new opportunities completely inaccessible via non-digital mediums. Of course, there are always attempts to replicate “real” counterparts, such as sports simulations.
Nevertheless, digital media operates under an entirely different set of fundamental principles than does traditional performance.

The question therein concerns where to draw these fundamental principles from. Performance theory is inadequate to answer this, as it operates under the aforementioned values of space, time, and community. Meanwhile, digital experiences treat these as flexible attributes. Furthermore, automata theory, the branch of computer science that formalizes computation and decision-making, generates guidelines that are too strict to sufficiently describe human experiences with computational media such as video games. Therefore, it is the intersection between performance studies and automata theory that strikes a chord for human interaction with computational media.

One entry point to this inquiry is through a discussion of mediatization. Mediatization is a component of media studies that captures not just the processing and distribution of information through media, but also how media can enact social and political change by framing communications. The relationship between media and medium is imperative here, as this process also exploits the physical context of an individual engaging with mediatized content. “Live” television is consequently ironic since the recording and distribution of any content for

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6 Fischer-Lichte, p. 40. Erika Fischer-Lichte defines the three pillars of performances as the enactment of the autopoietic feedback loop, “the creation of a community,” and “the creation of various modes of physical contact.”

7 Corner, pars. 4-5.
television is inherently an act of mediatization, thus negating the meaning implicit in a live experience.

Nevertheless, the supposition of “live” television changes the meaning of the mediatized content by juxtaposing the content’s immateriality within the context of a material reality. Diana Taylor describes such an example when watching the “live” funeral and procession of Princess Diana. Taylor found difficulty grasping why her and her daughter wept over this woman they did not know, wondering what caused her daughter to ask, “You won’t die, will you, Mummy?” The recognition of the experience’s roots in immateriality did not negate the experience’s tangible emotional impact.

Taylor’s conceptualization of archival and embodied memory offers a frame to analyze her experience with the mediatized funeral. She theorizes that cultural memory exists in what she deems the archive and the repertoire. The repertoire encapsulates the ephemeral world of performance, which in turn the archive partially preserves. While the archive cannot substitute in for the original performance, it has transformative potential by mediatizing performance to “generate, record, and transmit knowledge” alongside the repertoire.

Granting the archive, or (re)produced media, transformative potential places it in conversation with both performance and performativity. That is,

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8 Taylor, p. 133.

9 Ibid., p. 19-21.
the technological embodiment of media content along with the human perception of said embodiment is capable of altering or generating meaning in what is necessarily a social context. The limitation to a specific social context is an acknowledgement that the emergence of meaning arises not just from the act of technological embodiment, but from an audience’s interpretation and experience of mediatized information. In the following section, I introduce aesthetic theories of performativity that lead to a phenomenology useful in explaining the generative power of (re)production.

*Performativity and Oscillatory Phenomena*

Erika Fischer-Lichte describes the transformative power of performance:

> A new dichotomy has emerged between live performance constituted by the bodily co-presence of actors and spectators and the autopoietic feedback loop and mediatized performances which sever the co-existence of production and reception. Mediatized performance invalidates the feedback loop.¹⁰

She defines “live performance” as an event that puts two live bodies in relation to and contact with each other, thus enacting the “autopoietic feedback loop.” This phenomenon is an oscillatory relationship between actors and spectators—during a performance, the actors’ actions incur

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¹⁰ Fischer-Lichte, p. 68.
physical responses from spectators, which in turn affect how the performance proceeds. Fischer-Lichte declares “mediatized performance” as an invalidation of this relationship since it eliminates the actors’ physical presence, impressionability, and authenticity. Live performance is therefore uniquely transformative because it alters the role of an involved individual through *autopoiesis* (i.e. the enactment of the autopoietic feedback loop).

Fischer-Lichte draws her theory from a broader concept of *performativity*. “Performativity” implicates J. L. Austin and Judith Butler’s respective theories of linguistic utterances and bodily acts. Austin classifies certain speech acts as performative because of their ability to “succeed or fail” or “be true or false.” In effect, these utterances are transformative because they have the ability to change or create elements of social reality (e.g. saying “I do” in a marriage ceremony). Meanwhile, Butler centralizes on identity stating that repeated bodily acts are *performative* because they also constitute social reality. Yet, both theories appropriate performativity for use in expansive cultural and social contexts without observing its roots and practicality in theatrical performance.

Fischer-Lichte uses dramatic theory to reconcile Austin and Butler’s approaches and relate performativity back to its roots in performance. Her

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11 Ibid., p. 38.
12 Ibid., p. 25.
13 Ibid. p. 27.
resulting observation is the previously defined *autopoietic feedback loop*, an oscillatory relationship between “subject/object” and “signifier/signified” (using Austin’s terms).\(^{14}\) Role reversal through the autopoietic feedback loop is transformative because it redefines the social status of an individual attending a performance event.

Diverging from Austin and Butler’s respective theories, Fischer-Lichte categorizes her own observations as “an aesthetics of the performative.”\(^ {15}\) In doing so, Fischer-Lichte indirectly introduces an aesthetic category I will refer to as *oscillatory phenomena* that captures her theorization of autopoiesis. Much like how sound requires motion à la vibrations to exist, autopoiesis is a fluctuation (or oscillation) propagated through a medium, in this case actors and listener-spectators. Autopoiesis therefore constitutes an aesthetics of the performative because it describes the oscillatory phenomenology of transformative role reversal.

Apart from autopoiesis, oscillatory phenomenology provides a framework for developing related aesthetics for capturing the emergence of meaning in non-human performance. Fischer-Lichte correctly observes that mediatized performance severs the opportunity for role reversal between performers and listener-spectators, thus nullifying autopoiesis. Nevertheless, Diana Taylor’s aforementioned experience with her daughter suggests that mediatized performance is capable of enacting

\(^{14}\) Ibid., p. 25.

\(^{15}\) Ibid., p. 29.
transformative experiences despite the nullification of autopoiesis. Addressing this discrepancy requires a deeper inspection of the capacity for non-human performers to embody information.

**Automata**

“Mediatized performance” insinuates the appropriation of a performance in disregard to the medium’s core principles, but oscillatory phenomenology introduces new perspectives for considering how mediatized performances might be distinctly performative. Fischer-Lichte’s dichotomy between live and mediatized performance is therefore unsuitable for developing an aesthetics of the performative for mediatization. Hence, I will disregard her presumed dichotomy and expand the study of mediatization to that for the realm of all *automata*.

Automata theory is a branch of computer science that formalizes the logical decision-making of machines (i.e. automata) to express the scope of all computation.\(^\text{16}\) Essentially, automata theory is the study of what computers can do and what kinds of problems they can solve. An *automaton* is a type of computer—based on an input, it computes an output. Automata theory offers formal analytical techniques for describing the operations of various forms of computational machines as the one seen in *Fig. 3*, which detects binary numbers that are a multiple of three.

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\(^{16}\) Definition adapted from Kozen.
Nevertheless, the details of these analytical procedures exceed the scope of this paper and I will instead generalize automata as machines that operate via some pre-defined internal logic to carry out tasks accordingly.


**Fig. 3.** Example of a deterministic finite automaton (DFA). *Wikipedia.* 20 Mar. 2007, en.wikipedia.org/wiki/Deterministic_finite_automaton.

Although “automata” may seem like an excessive generalization that adds unnecessary ambiguity, the term avoids the erroneous assumption that all computational media pertains to digital technology. My prior references to digital media intentionally reduced this scope for the sake of clarity, but I now wish to take in account analog technologies as well to holistically capture the scope of all computational media. “Automata” dispels notions of digital exclusivity and alludes to its performativity by referencing classical notions of automata in popular media—machines that mimic living creatures—such as the one in Fig. 4. While “computational media” defines a similar range of subjects as “automata,” it nevertheless entertains a connotative bias towards digital media. Thus, I have opted to

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17 Artist James Bridle has already articulated a non-performative aesthetics for digital technology, which he coined as “The New Aesthetics.”
use “automata” for theoretical discussions and “computational media” when more applicable.

“Automata” also invites an immediate confrontation of how one might enter this field of inquiry by asking, “Can an automaton perfectly replicate a human (or other subject) to the point where a listener-spectator could not discern the impersonation, and if so, what are the resulting implications?” Addressing the former point, I provide a hesitant “yes.” While current technologies are not entirely sufficient on a universal scale, they increasingly demonstrate their capabilities to at least succeed in particular instances. For example, Google’s ventures into artificial intelligence research recently resulted in Google Duplex, a product that uses natural speech recognition to seamlessly automate phone calls.\(^{18}\) Regardless, the more pressing question is of resulting implications, which elicits two potential scenarios.

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\(^{18}\) Leviathan, pars. 1-2.
In the first scenario, the automaton perfectly replicates its real counterpart. It is reasonable to then assume that the aforementioned aesthetics of the performative for performance should apply. Imagine a singer that lip-syncs onstage—if their accuracy is sufficient, the experiences remains unchanged for the audience. Even if one party, whether it be the actor or listener-spectator, is actually a fabrication, the other party is sufficiently unaware to have that fact affect their experience. Google Duplex succeeds in this regard for its precise use case as its presence as a robocall is effectively invisible to the receiving party.\textsuperscript{19} Hence, a transformative experience can unfold albeit with potentially malicious motives due to its reliance on deception.

In the second scenario, the automaton perfectly replicates its real counterpart, except the individual that perceives the automaton has some degree of awareness to its true fabricated nature. The effect is akin to the content on thispersondoesnotexist.com, which is a website that uses a form of artificial intelligence known as GAN (Generative Adversarial Networks) to generate photorealistic human faces.\textsuperscript{20} In shown in \textit{Fig. 5}, the technology is imperfect and frequently generates artifacts that destroy the illusion. The automaton may be imperceptible in all other ways, but the knowledge of its true materiality fundamentally alters the experience and imposes a new aesthetics of the performative for automata.

\textsuperscript{19} Leviathan, pars. 2-3.

\textsuperscript{20} Horev, par. 1.
Marina Abramović, renowned performance artist, provides a case study that demonstrates this second scenario. Two complementary pieces are of relevance: 2010’s *The Artist is Present* at MoMA, and 2019’s *The Life* at Serpentine Gallery. The former was an exhibit in which Abramović spent hours in person each day for several months sitting silently across from visitors. While not a direct response, *The Life* was a recent mixed reality exhibit where attendees could witness Abramović’s likeness despite her absence. This required the use of augmented reality (AR) headsets that depicted a digital representation of the artist in the room and alongside the other attendees. The relationship between the pieces is evident in their differing treatment of the artist as a physical body within the space.

Abramović intended for her audience to recognize the link between reality and automata in *The Life*. (The piece’s website even featured the

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21 Description adapted from the official webpage for the MoMA exhibition, moma.org/interactives/exhibitions/2010/marinaabramovic.
claim, “Please note this is a digital experience in Mixed Reality. The artist is not present.”) Guardian reporter Jonathan Jones responds to the exhibit:

I kept watching [The Life] over again, waiting for some emotional or intellectual depth to materialise. Instead, the optical illusion got less and less convincing and the headset heavier. My eyes began to ache... There is no intimacy or human presence.

Jones tries to find meaning in the performance—he searches for autopoiesis to ultimately realize that the work itself will neither react nor change. Instead, only his perception of the work does as the “optical illusion” degrades into its irrevocable digital form.

Much of Jones’ denigration of the piece concerns the absent artist. He criticizes her lack of modesty stating, “The only reason to be thrilled by this digital Abramović is that you adore the real Abramović as a star.”

Therefore, Jones states that Abramović’s key characteristics (one being her physical presence) were nonexistent in the piece while simultaneously stating the only reason to experience the piece is to experience the artist. This contradiction and frustration are the same as Diana Taylor’s aforementioned struggle with Princess Diana—there is an oscillatory

22 Rea, par. 3.

23 Jones, par. 9.

24 Ibid., par. 8. “Nothing is going to happen to the simulacrum Abramović, nor is anyone in the audience going to be challenged.”

25 Ibid., par. 7.
discrepancy in deciding what capacity these “immaterial” subjects exist and how they relate to their material (re)productions.\textsuperscript{26}

For Taylor and Jones’ experiences, perception of the automaton was variable and shaped each performance through the occurrence of oscillatory phenomena. An oscillation emerged between perceived immateriality and materiality that fundamentally changed what the presented media content meant in the listener-spectator’s perspective. Furthermore, the stark contrast in Taylor and Jones’ responses to their respective experiences demonstrates the range of uses for oscillatory phenomena in generating meaning.

Taylor’s situation demonstrates how televised media content is capable of translating cultural memory by embodying said information through a tangible object. The supposition of a “live” broadcast is actually a useful technique as to direct the listener-spectator’s attention away from the television’s materiality and instead focus on the immaterial media content. At the same time, watching a live broadcast encourages the audience to engage with the broadcasted content, when in fact an individual can only physically engage with their television. Through mediatization, the immaterial content enters a new form of materiality that exists within the social sphere of its audience. In Taylor’s case, this

\textsuperscript{26} Ibid.
phenomenon allowed for an impersonal event to have deep emotional implications for her and her daughter about the nature of mortality.

Similarly, Jones’ frustration with automata does not necessarily represent a failure on the automaton’s part (which is a matter of opinion) but demonstrates a counterpoint wherein an automaton’s materiality becomes the crux of perception. Just as Jones denigrates The Life for its supposed lack of content and its inability to sustain Abramović’s illusion, the piece draws his perception away from the immaterial content to the medium’s materiality. Doing so alters the meaning of the illusion by calling attention to its separation from live human bodies. Abramović therefore comments on the inadequacy for automata to replicate human performance because the meaning of performance changes significantly when (re)produced as a “simulacrum.”

This aesthetic of automata’s oscillatory phenomenology is familiar in the video game industry where critics, developers, and audiences alike generalize it as immersion. In the context of video games, “immersion” is the degree to which a player temporarily deprioritizes the materiality of a video game object and instead sees its immaterial content as material. However, the aforementioned cases utilize a mode of perception that is opposite to immersion as well.

27 Ibid.

Fully understanding automata’s transformative or performative potential requires a consideration of the oscillatory phenomenology for automata, which necessitates the construction of a converse state I will refer to as displacement. “Displacement” is therefore the degree to which an individual consciously recognizes the immateriality of media content while simultaneously perceiving the physical materiality of the relevant automaton. An aesthetic of the performative for automata emerges through the oscillation between states of immersion and displacement.

*Immersion/Displacement; Play/Playfulness*

Ernest Adams, founder of the International Game Developers Association (IGDA), comments on immersion:

Include as much detail as you can to help the game’s immersiveness, up to the point at which it begins to harm the gameplay. If the player must struggle to look after everything you’ve given him, the game probably has too much detail.29

Video games typically aim to strike a balance between immersion and displacement that prioritizes providing the player with a sense of authority—hence, the audience comprises “players,” not just listener-spectators. Adams exposes the practical thinking developers require to empower and not overwhelm a player in their experience, while

29 Adams, p. 100.
standardizations in video game controllers (see Fig. 6) and contexts (e.g. genres) help to bolster this process.

![Fig. 6. From left to right: patents for the Xbox One, PlayStation 4, and Nintendo Switch controllers. The designs are consistent in their button, trigger, and analog stick layouts.](image)

Immersion and displacement offer rich modes of directing an audience’s perception to create new meanings, social realities, and more importantly to define an individual’s ability to interact with these realities. In video games, this interaction is fairly literal as the audience inherently expects a high level of engagement with automata. Other mediums, such as film, deemphasize direct user input while still exhibiting oscillations in immersion and displacement as a mode of audience interaction. Both video games and film feature experiences in which an automaton’s non-performative aesthetic components (e.g. its visual and audible aesthetics) engender performative aesthetics by allowing audiences to physically, mentally, and emotionally engage with otherwise immaterial subjects.

As explained in the prior sections, automata are predictable and conspicuous, so they derive their subjectivity by controlling (or at least, attempting to control) human perception. The objective nature of an

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30 Patents of relevance include (but are not limited to) US8641525B2 (Xbox One), US010099121 (PlayStation 4), and US9724601B2 (Nintendo Switch).
automaton’s actions always exists within a subjective lens that has the power to establish new social realities or alter preexisting ones. Static mediums, such as the visual arts, partially demonstrate this transformative power. Skewed representations of reality, like Massimo Vignelli’s overly-minimalistic subway maps for New York City, have the ability to shepherd different understandings of the social world.\(^3^1\) Attention to subjectivity existed long before the invention of automata, with artists like Hans Holbein exploring conspicuously distorted forms in paintings to reference the medium itself.

![Fig. 7. Holbein uses anamorphosis to make a skull only perceptible from certain angles, forcing the viewer to enter a perspective that skews the remainder of the painting.\(^3^2\)](image)

The potential for social transformation expands greatly with automata because they can dynamically direct attention and subjectivity. Automata utilize the aesthetics of design such as those seen in Vignelli’s

\(^{31}\) Rawsthorn, par. 2.

and Holbein’s work to dynamically modulate the audience’s degree of immersion or displacement. This modulation, or oscillation, differentiates an automata’s performative ability from a static artwork’s limited degree of transformative potential.

The difference between an aesthetics of design and an aesthetics of the performative also relates to the concept of play. Ludology, or the study of play (alternatively, the study of games), does not offer a single definition for “play” and instead focuses on the qualities intrinsic in play.\(^{33}\) Of note is Miguel Sicart’s connection between play and computers. He states, “…computers need to have instructions designed for them so they can execute an activity. Similarly, play requires a certain element of design, material or contextual or both, so we know we can play…”\(^{34}\) The comparison between the motivations of computers (i.e. automata) and people for play provides an additional justification of an automaton’s ability to function as another type of performer distinct but similar to a human. The ability to act, even in the context of automata, leads to a deeper realm of prospects inaccessible solely through design.

Sicart’s writings on play talk extensively on the connections between automata and play, but play’s roots in appropriation prevent it from serving as a holistic framework for performativity. This is because play is “autotelic”

\(^{33}\) Sicart, p. 6.

\(^{34}\) Ibid., p. 7–8.
in that it is “an activity with its own goals and purposes.” Sicart extends
this to automata by stating that since automata theory captures all of
computation, programming a computer is akin to appropriating one
machine inside of another. For this reason, an aesthetics of the
performative for automata requires the interaction between automata and
humans, which materializes through the oscillation between immersion and
displacement.

The evocative nature of oscillatory phenomena is consequently not
derivative of play, but of playfulness. “Playfulness” is an embodiment of the
attitude of play without the action of play. For example, theatrical
performance is a context in which aspects of playfulness serve to enact a
performative experience in the form of the autopoietic feedback loop.
Antonin Artaud observes the exploitation of playfulness in performance by
comparing the treatment of listener-spectators to that of snakes by
“snakecharmers.” He proposes that artists engage with the bodies and
senses of their audiences similar to how snakecharmers use music to
create vibrations that reverberate into the snakes’ bodies. Playfulness in
performance is therefore a means to performativity through autopoiesis.

35 Ibid., p. 16.
36 Ibid., p. 100.
37 Ibid., p. 21.
38 Artaud, p. 81.
Playfulness for automata is likewise a means to performativity through the oscillation between immersion and displacement. The use of playfulness is contingent on the relevant medium but generally serves as a way to direct or motivate an audience’s perception. At this point, the purpose of this should be clear—to generate new meaning from the tension between a material automaton and its immaterial media content.

This concludes my theorizations on an aesthetics of the performative for automata. The following chapter focuses on applying the aforementioned theories to specific case studies, including my companion piece to this paper, No Replica.
III. STUDIES OF AUTOMATA

An aesthetics of the performative for automata is not exclusive to any particular use or type of automata, much as an aesthetics of the performative for performance (i.e. Erika Fischer-Lichte’s theory of autopoiesis) is applicable to all contexts for performance. I have purposefully avoided arbitrarily dividing automata into subcategories as this would place undue emphasis on the techniques that designers employ to modulate immersion and displacement. While specific popular mediums such as film and recorded music feature mostly homogenized use of automata, the central concept of audience perception of automata is consistent throughout all use cases.

Instead, I aim to analyze several works featuring automata that engage with elements of intermedia. Dick Higgins, pioneer of the Fluxus movement, coined “intermedia” to summarize the interdisciplinary efforts of artists in the 1960s—these developments represented a major shift in the recognition of medium and materiality’s effects on artistic reception.39 Experimental musicians expanded beyond western music theory to explore the nature of music as an artform, leading to pieces like John Cage’s 4’33” disrupting assumptions for musical performance.40 These works emphasized the role of the musician as a performer and thereby acknowledged a new materiality inherent in the generation of all art.

39 Nyman, p. 79.

40 Ibid., p. 3–4.
A similar performative shift is currently occurring in the field of computational media. Artists particularly in the realm of generative art are utilizing digital tools to create new forms, expand on old ones, and comment on mediums. For instance, Davide Quayola’s *Captives* series juxtaposes the aesthetic of Michelangelo’s half-finished marble statues with low-poly 3D geometry and artifacts of CNC milling. Rafael Lozano-Hemmer’s *Pulse Room* allows attendees to translate their own pulse into a sculpture composed of flashing lightbulbs, each of which representing a different person’s heartbeat. In both cases, the artists draw attention to a new materiality for digital processes in field of sculpture and interactive art.

![Image of sculptures and light display](quayola.com/captives-series)

**Fig. 8.** Davide Quayola’s *Captives* series. 2013–5, quayola.com/captives-series.

While perhaps not as formalized or consolidated as the experimental music movement of the 20\(^{th}\) century, shifts toward the performative exist in film, video games, and even performance with the reconsideration or

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\(^{41}\) For more information, see Lozano-Hemmer’s webpage for the piece, lozano-hemmer.com/pulse_room.php.
introduction of automata. In performance, theater ensemble Complicité’s *The Encounter* used headphones and binaural audio to create immaterial spaces out of sound, while onstage microphones changed the audience’s perception of ongoing events. In music, experimental singer and composer Holly Herndon’s *Platform* incorporates abrasive electronic sonic elements in a pop song format to clash musical form with everyday technologies—Sophie Xeon’s music, especially the track “Ponyboy”, follows in a comparable pursuit. Evidently, the contemporary artists showcasing the relationship between materiality and immateriality are numerous and diverse.

For the remainder of this chapter, I will centralize on two case studies featuring automata that differ in their prioritization of materiality or immateriality. The first study is of my sound performance, *No Replica*, which I devised as a direct test and exploration of an audience’s perception of automata in a performance context without the explicit use of human actors. The second study is a comparison of two video games, *The Witness* and *Baba Is You*, both of which use puzzle mechanics to radically change the player’s perception of the game world. In contrast to *No Replica*, these titles prioritize the digital (i.e. immaterial) experience over the physical (i.e. material) one. These examples are far from exhaustive but illustrate a range of contexts for automata’s aesthetics of the performative.
**No Replica**

*No Replica* was a sound performance that did not feature human actors and instead entirely transpired through nineteen speakers and the audience’s interactions within the theater. Over the performance’s thirty- to forty-five-minute duration, a series of preset recordings guided the audience to enter spaces and perform actions. By listening for the origins of sounds, soundscapes, and explicit (recorded) verbal instructions from speakers around the theater, the audience (a maximum of sixteen individuals) decided where to go and what to do.

The concept behind *No Replica* was to abandon traditional narrative content in favor of creating a performance from the audience’s interactions with technology. Since this investigation occurred before my formalization of the theories presented in this paper, I operated on guiding questions that aimed to explore the nature of technology as a type of performance: Is a speaker an instrument, and if so, can an audio file be a performer?

Audience reactions to *No Replica* clarified that the value of automata in performance is to engage audience members as *percipients.* Misha Myers employs the term “percipient” in reference to the project *Carrlands,* which required participants to download audio files and listen to them while walking in specified everyday locations.42 In the absence of performers, the audience members become more “active and generative in

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42 *Carrlands* is available at its website, carrlands.org.uk.
the creation of meaning.”43 “Percipient” moves the performance’s focus away from actors’ ability to create meaning in favor of the audience’s “skilful \[s/c\], embodied and sensorial engagement.”44

As an investigation in oscillatory phenomena, No Replica exploited sound design and aural phenomenology to direct the audience’s generation of meaning rather generate meaning itself. Through its use of automata, namely speakers and recorded audio, No Replica controlled audience responses, oscillating between states encouraging immersion or displacement. For example, the performance began with a voice-over vaguely instructing the audience how the proceeding events might unfold. This dialogue featured extended pauses that forced the audience to perceive the theater and its associated technology visually, aurally, and physically. Similarly, moments of repeated audio were frequent since subsequent repeats deemphasized semiotic meaning in favor of performative meaning. Therefore, instances only became meaningful through the act of perception.

43 Kendrick and Roesner, p. 71. Myers cites Carrlands creator Mike Pearson in her chapter, “Vocal Landscaping: The Theatre of Sound in Audiowalks.” The full quote reads, “[Carrlands] becomes what Pearson describes as an innovative form of site-specific performance ‘from which performers are absent’ but within which the audience member plays an active and generative role in the creation of meaning, as a participant...”

44 Ibid.
The performance’s initial conceit of audience interaction also played into the idea of percipients. Although the audience encountered this deceptive claim at face value, various details regarding the space and recordings made such a claim seem dubious. For example, microphones around the space were visibly unplugged as they served no technical purpose as seen in Fig. 9—through a listener-spectator’s interaction with the space, these details become clear. Moments of elucidation about the dubious nature of automata in No Replica aimed to instill a sense of doubt in the audience as to how the immaterial sounds related to the material technologies in use. These efforts even included the use of broken technology as set pieces to obscure the presence of functioning automata (see Fig. 10).

Fig. 9. The starting area for No Replica. Drawn out silences incited audience participation despite the lack of specific instructions.
The emergence of meaning in *No Replica* relates to a “performativity of listening” that arises from “a certain *presencing* of the embodied act of listening itself.” While “to hear” implies that a sound occupies an individual’s aural attention, “to listen” implies an individual’s attempt to discern a focus out of a larger soundscape. The act of listening therefore placed bodies and objects in relation to each other by emphasizing their materiality in the context of trying to engage with automata’s immateriality. Since the modes of interaction between listener-spectators and automata were ambiguous—in reality, there was no way for audience members to affect the technology of the performance despite the appearance of such a connection—it became clear that the audience’s perception and

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45 Home-Cook, p. 47.

interpretation of the performance led to transformative potential in place of autopoiesis.

Beyond the use of sound, I worked with set designer Ava Calabrese Grob to craft a series of immersive spaces that encouraged audience interaction in their own right. In the effort of eliminating narrative meaning, we switched conceptual focus several times during the process and ended up with a theatrical concept representing numerous ideas with very little thematic cohesion. The only requirement for each space was the necessity for some non-obvious mode of interaction that a (re)produced audio sample could incite. The resulting spaces included representations of a grocery store, road, and library, each featuring sparse moments of spoken instruction to encourage (and permit) audience interaction.

![Fig. 11. An overview of the set for No Replica.](image)

The use of automata in No Replica did not intend to convince audiences that their predisposed notions of performance could exist without actors. Instead, the emphasis was on an audience’s ability to generate performative meaning without a complementary reactive body or
autopoiesis. The (re)produced audio in *No Replica* ranged from human and instructional to alien and abrasive as to reinforce the notion that an individual cannot exclusively evaluate automata in performance under the guise of performance studies. It is consequently necessary to engage with an aesthetics of the performative for automata, as I did in the preceding chapter.

*Meta-referentiality in Puzzle Games*

Puzzle games are unique amongst video game genres as they must define their own set of rules for the player to reach a completion, or victory, state.\(^{47}\) Thus, playing the game consists of a player gradually understanding the game’s internal logic and ultimately earning some level of proficiency. This is distinct from pseudo-puzzle games like *Tetris*, where non-puzzle mechanics such as technical ability or time constraints take the central focus.\(^{48}\) Instead, puzzle games are more akin to the creation of a new medium with unique modes of interaction.

This philosophy is prevalent in the designs of 2016’s *The Witness* and 2019’s *Baba Is You*. The titles develop strict and consistent rules of internal logic that inform all the ways in which a player is able to interact with the respective media object. It is important to note that this observation is comprehensive—these rules end up defining modes of interaction.

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\(^{47}\) Adams, p. 583, 588.

\(^{48}\) Ibid., p. 584.
interaction that actually transcend barriers imposed by the notion that something is explicitly a puzzle. For the remainder of this section, I will focus on how *The Witness* and *Baba Is You* extend their rules for player interaction to modulate the player’s perception of the media object’s materiality and immateriality, thus generating new meaning out of an otherwise utilitarian experience.

![Fig. 12. Screen captures of early “tutorial” levels for *The Witness* (left) and *Baba Is You* (right). Credit to Ars Technica for *The Witness* image.](image)

While the games differ immensely in their visual aesthetics, their core principles are remarkably similar in their minimalistic puzzles and associated rulesets. *The Witness*, set in a lush 3D overworld that promotes player exploration, actually centralizes on self-contained line puzzles presented on panels scattered across the game world. On the other hand, *Baba Is You* uses crude and low-framerate 2D graphics but comparably introduces self-contained levels within a consistent puzzle framework. In this case, these puzzles require the reorganization of rules to change in-game mechanics. Across both titles, the central focus is on the player naturally learning about how core puzzle mechanics operate through play.

What differentiates these titles from other puzzle games is their gradual appropriation of core mechanics to direct attention towards the
relationship between materiality and immateriality. Throughout each title, the sheer quantity and variety of puzzles leads to a greater sense of immersion where a player’s expertise results in an unconscious understanding of game logic. Therefore, the player no longer thinks about the nature of the puzzle game and instead focuses all attention to completing these puzzles. However, both *The Witness* and *Baba Is You* eventually reveal that their self-contained puzzles are actually a part of a larger framework of puzzles that extend to areas previously assumed to purely practical, such as level selection screens and overworlds.

In *The Witness*, this transpires when the player realizes the game’s line puzzles are actually imbedded into environmental artifacts, which the player can complete as if they were ordinary puzzles. As seen in *Fig. 13*, a river with a similar geometry to the line puzzles serves as a tacit invitation for the player to extend their learned proficiency into a previously unseen context. The game consequently disrupts the player’s immersion by revealing the entirety of their interaction with the video game media object, not just with the immateriality of specifically laid-out puzzles.

*Fig. 13*. Screen captures of meta-referential levels for *The Witness* (left) and *Baba Is You* (right). Credit to IGN for *The Witness* image.
The same prospect exists in *Baba Is You*, where the outcome of a late-game level actually permits the player to interact with the level selection screen as its own puzzle. It becomes clear that the imposition of self-contained puzzles is entirely arbitrary as an individual’s experience with the media object extends into all interactions with that media object. As was the case with *The Witness*, the game temporarily strips the player of their immersion to elucidate the media object’s materiality, although the player is free to return to an immersive state following this moment of displacement.

Since video games promote deep states of immersion, meta-referentiality is a useful technique that allows for the player to reflect on the experience and make tangible what was previously intangible. This is obviously not a requirement of video games but allows for a deeper engagement inaccessible through other mediums, particularly since player interaction in video games is capable of directly conveying meaning without the aid of narrative or explicit instruction. In the context of automata, the medium of video games is still adolescent and titles like *The Witness* and *Baba Is You* demonstrate the rich potential for the emergence of meaning in future experiences.
V. Conclusion

An aesthetics of the performative for automata is a gateway theory that encourages theater practitioners and artists to reconsider the role of technology in performance. This is partially a preemptive measure in the face of rapid advancements in immersive media technologies (e.g. augmented and virtual reality), artificial intelligence, and digital distribution platforms. These tools offer ways to dramatically enhance traditional performance, but also pose a risk to performance by potentially deemphasizing the medium’s essential characteristics. By differentiating the role of actors and automata in performance, practitioners can utilize each medium in its appropriate context.

To quote experimental musician Pauline Oliveros, “Awareness... is a tool for synthesis.”49 The emergence of meaning is primarily a perceptive act, and as such automata has no performative meaning without the context of an audience. I invite further investigations of automata’s ability to direct audience perception and generate meaning, particularly as new technologies for interacting with media become more prominent. Trends in the technology industry will dictate how populations interact with media, art, and performance, and it is vital that practitioners then understand how to use these tools to adapt and evolve their projects.

49 Oliveros, p. 130.
Aesthetics of the performative. The observable and/or describable components of performativity.

Automata (singular: automaton). A physical technology (i.e. hardware) capable of producing or reproducing media content. Examples include speakers, computers, projectors, augmented and virtual reality devices, record players, and televisions. Synonymous with computational media in the context of this paper.

Autopoiesis and the autopoietic feedback loop. An oscillatory feedback loop between actors and listener-spectators during a performance. An actor’s actions elicit reactions from a listener-spectator, which in turn causes the actor’s performances to shift. This constitutes a transformative experience through role reversal, since a listener-spectator and an actor perform each other’s roles in turn. This role reversal is performative because it produces social change.

Immersion and displacement. Opposite states of an individual’s conscious perception of an automaton’s materiality. An individual is immersed if they become engrossed in the automaton’s immateriality (i.e. the media content it presents) and lose conscious focus of the automaton’s materiality (i.e. its physical presence). An individual is consequently displaced when these aspects are reversed.

Mediatization and mediatized performance. The process of (re)producing and distributing something beyond its initial occurrence.
using automata, consequently framing the original object in the context of new social and political meanings.

**Oscillatory phenomena.** Phenomena generated by changes in state. Autopoiesis is an example of oscillatory phenomena, as is the oscillation between immersion/displacement.

**Performance, performative, and performativity.** Generally, *performativity* is the ability to enact transformative social change through *performance*. Differing theories of performativity independently describe what performances are capable of enacting said change. Something that is *performative* is transformative in that it enacts social change.

**Play and playfulness.** For the purposes of this paper, *play* is autotelic in that it is an act with its own purposes and goals that does not serve a larger function. *Playfulness* is the attitude of play appropriated for contexts other than play.

**Transformativity and transformative experiences.** The process of a social change, such as role reversal through autopoiesis.
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