PROCEDURALITY AND PERFORMATIVITY: CONCEPTS AND PRACTICES

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This paper focuses on human performance and its role in the enactment of algorithmic artworks, considering the human body as a medium for artistic creation. It defines procedurality as a core concept in relation to performative practices, while establishing analogies between human and artificial systems. To this end, it discusses performativity as a concept, addressing different understandings of the term, from human performance to the performativity of code and, finally, the interactive performativity of both human and technological systems. It then addresses artistic practices that simulate human performative strategies through computational means, and considers artworks that reverse this logic, by translating computational processes into the physical realm through the human execution of algorithms, and finally, combining the interplay between human and technological systems. Considering these approaches, this study aims to emphasize how procedurality is tied to both human and computational performativity, while also highlighting the human-computer interactive feedback-loop as the performance of the work.

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1 INTRODUCTION

This study considers procedurality as a core concept within artistic performative practices, addressing the role and meaning of the human performer in the enactment of algorithmic artworks. As the ability to execute rules, resulting from the description of processes into formal instructions (such as algorithms), procedurality can conceptually encompass both computers and humans as the entities that perform those rules. In the arts, this notion was imported from music (as one of its inherent qualities), being conceptualized and reconceptualized within a broader scope of performative practices that entail procedures as instructions for action. The notion took shape in computational terms as new media artists started to think in terms of both human and code's performativity and their combined role in the enactment of the artwork.

In order to contextualize this shift, we present an overview of the notion of *performativity*, as a concept and practice. We discuss the term under the perspective of artistic practices that imply human performativity (as in performance art) and computational practices involving the performativity of code, as well as performativity applied to the interaction between human and technological systems. Following Salter's (2010, 21) view on "performance as practice, method, and worldview", we discuss examples that illustrate the human performer's role in the enactment of the work, and artworks that simulate human performative strategies through computational means, as well as works that reverse this logic, by translating computational processes into the physical realm through their human execution. Finally, we discuss practices "that operate on, shape, and transform the world in real time" (Salter 2010, 33) by developing a human-computer feedback-loop as a form of interactive performativity.

2 OVERVIEW

2.1 PROCEDURALITY

Janet Murray (1997) defines *Procedurality* as the computer's "defining ability to execute a series of rules", or the ability to perform formalized abstract processes, to which we call algorithms. As formal procedures or methods, algorithms can be considered independently from both the programming languages and the machines that execute them (Goffey 2008, 15-16). Therefore, to consider procedurality as a concept extensible to both human and computational systems entails an abstract understanding

of code, as "real abstraction" or "absolute code", which allows us "to consider the general properties shared between different code forms", and thus to think in terms of "both the grammar of code itself" and the programmer's algorithmic/computational thinking (Berry 2011, 33).

In line with this view, Cramer argues that "software code *is* a conceptual notation", however, often neglected as an artistic argument due to a "privileging of *aisthesis* (perception) over *poiesis* (construction)" that contributes to "a restrained concept of art as only that what is tactile, audible and visible" (Cramer 2002). So, what the term procedurality seeks to emphasize is a focus on "the processes themselves", rather than simply their outputs (Wardrip-Fruin 2006). In this sense, it refers to the creation of "meaning through the interaction of algorithms" (Bogost 2008). Procedural authorship then means writing the rules that model the way things behave, or defining "the conditions under which things will happen in response to the participant's actions" (Murray 1997, 152). Hence, to think procedurally is to think in terms of the system's "expressive processes", which entails "the structural design or composition of the procedures" that generate variable outcomes (Wardrip-Fruin 2006, 1). In sum, it means to think of software and its creative potential on a generative and interactive level.

2.2 PROCEDURALITY IN THE ARTS

The concept of procedurality is not exclusive to computation, and we can discuss this idea by considering works that make use of notation as a script for action. The concept of notation was brought to the fore in art through music, which gradually became "the model for all performance art" as artists started to explore the gaps between this and other art forms as new fields of practice (Shaw-Miller 2009). For example, Fluxus artists considered "the broader framework in which music signifies" by exploring its procedural and performative nature as guidelines for artistic actions, whose sensory results are seen as the by-products of action. So, we can say that the procedural nature of music was brought to attention by the Fluxus aesthetics as they reinterpreted the concept of the *score* as a type of notation for action, developed *a priori*, as "the agent that engages the reader-performer in the theatre of the act" (Shaw-Miller 2009).

As the "silent partner" of music, visual notation is used as "an expedient for catching an inspiration with the purpose of exploiting it later", being the role of the performer "to resolve the rigidity of the signs into the primitive emotion" (Busoni 1911, 15-16).

Accordingly, Fluxus pieces "almost always provide instructions for setting up a situation", demonstrating how the "score (...) is not simply a transparent vehicle of description but an acquired and culturally mediated system" for art making (Shaw-Miller 2009).

2.3 NOTATION AND EXECUTION

The score can either give "exact instructions with regard to both its reception and its use" or allow the "realization of a work-idea according to the discretion of each performer" (Schroeder 2010). All scores condition execution depending on how closed or open they are to interpretation, whether developed *a priori*, intending to "facilitate the performability or (re)production of a work", or *a posteriori*, enabling the work's analytical perception and having its "own aesthetic value as a visual art" (Schroeder 2010). Given that these works make use of notation as a script for action, they can be considered analogous to the use of code for computation, if we conceive of them as algorithms that "meet the requirement of being executable by a human being as well as by a machine" (Cramer 2002). The use of scores for action therefore stresses procedurality as an inherent quality of performance, supporting an analogy between these forms of notation for human execution (as performance) and software code, where notation and execution "fall into one piece of instruction code" (Cramer 2003).

Following the idea of a script for *action* as the "act of realization, of execution, which is itself the very momentum of the aesthetic experience", the notion of execution conflates with the notion of performance, which emphasizes the "live dimension" of an execution (Broeckmann 2005). In line with this broader understanding of performativity, and as Frieling (2003) explains, contemporary art practices are returning to, and investigating, the "beginnings of process-based art made with and in the media", while evoking questions explored by "twentieth-century avant-garde currents on the relationship between happening, action art and performance".

3 PERFORMATIVITY AS A CONCEPT

According to Chris Salter, "everything has become performative", and "performance as practice, method and worldview is becoming one of the major paradigms of the twenty-first century", even if the terms "performativity" and "performance", lack conceptual clarity due to their different uses and approaches in distinct disciplines (2010, 21-23).

Despite its different connotations, the concept of performance "articulates a common thread: that humans, things, and matter are not fixed but always in a process of change and becoming" (Salter 2010, 30). The author then underlines "certain characteristics of performance that distinguish it from other forms of knowledge making", of which we can foreground the focus on the "enaction" of "real-time dynamic processes" and "the effect of both human and nonhuman presence" (Salter 2010, 23); the latter "invoking a space that refuses to make a demarcation between inanimate technology and human interpreter" that is characteristic of new media interactive art (Salter 2010, 32).

Following this view, we now discuss different understandings of performativity: as developed in the arts (concerning human performance), as a method or way of doing something according to an orderly, logical, systematic plan (evoking the performativity of code) and, finally, as a performance that articulates both human and technological systems (as an interactive performativity).

3.1 HUMAN PERFORMANCE

In the artistic context, the term *performance* is commonly understood as describing "actions, happenings, and time-based events emerging out of the visual arts during the 1950s through the 1980s" (Salter 2010, 23-24). Contemplating the "live event" as a form of expression for "auratic uniqueness" (Frieling 1997), these practices "aimed above all to distance themselves both from the static objects of the visual arts and the dramatic, text-based theatre of the stage" (Salter 2010, 24). Using the body as a medium for artistic creation, they aimed to "explore alternative models and ways of seeing, establishing an emotional and mental framework that integrated the performer and the audience via direct appeal to the senses", bringing together art and life "in an 'intermedia' relationship" (Frieling 1997).

Performance became a way of making art, while embodying the "corporeal presence and materiality" of the human body in the process of art making (Frieling 1997). According to Salter (2010, 25), this lead to a reconceptualization, or *performative turn*, considering performance not only as an artistic practice but also as a method. As Frieling (1997) stresses, all performative art forms, despite their particularities, shared the same interest in "process-orientation, conceptualism, irreproducibility, randomness and interactivity" as principles that, rather than an art form, define a way of making art.

3.2 CODE AND PERFORMANCE

The reconceptualization of performance drew attention to fields of study like linguistics and speech act theory (Salter 2010, 25), which relates to a focus on the "tacit, non-verbal, embodied, and immanent act of *doing*" inherent to practices that are "more concerned with 'performance' than with 'competence'" (Salter 2010, 25), that is, "more interested in *parole* (speech) than *langue* (language)" (Arns 2004).

Resorting to this analogy Inke Arns (2004) contextualizes performativity as a quality inherent to software code considering its ability to act and produce variable results. The author's definition of "code's performativity" is not necessarily associated to its "ability to (pro)create and generate, in a purely technical sense" (Arns 2004), but rather concerned with its "concrete realizations and consequences" in terms of "its effect on the domains of aesthetics, politics, and society". This view highlights the effects of code's "actualization", evoking its "translational quality" when shifting from a "static atomic form" to an "articulatory form" (Berry 2008) through computation. And it is in this sense that the performative dimension of code is emphasized, whenever "enacted or actively performed anew" (Salter 2010, 26).

3.3 INTERACTION AS PERFORMANCE

According to these different connotations we can consider performativity as a quality of "real-time actions played out in front of a spectator alongside", be it through human or machinic agency, that is, "the agency of machines trying to equally effect changes in the material conditions of the world" (Salter 2010, 32). Drawing on this idea, and as Salter (2010, 32) states, we can also consider performativity in terms of "artistic processes and events in which the human may no longer be the sole locus of enactment but performs in tandem with other kinds of beings", namely machines, therefore merging human and technological systems in the performance of the work.

The author adds that "artistic performances that integrate technical systems into their intended strategies of artifice" fuse "multiple concepts of performativity simultaneously", also highlighting "one of the hallmarks of performance", that is, "its material embodiment in the world—whether that body is defined by human, machine or other" (Salter 2010, 32).

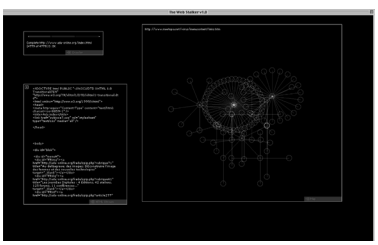
4 PERFORMATIVITY AS A PRACTICE

4.1 FROM HUMAN PERFORMANCE TO CODE

Fig. 1. *The Leaning Tower of Venice* (Ralph Rumney 1958).

Fig. 2. *Touareg Circle* (Richard Long 1988).

Fig. 3. *Webstalker* (I/O/D: Mathew Fuller, Colin Green and Simon Pope 1997).



Often, performance practices "consciously and intentionally entangle technologies", along with the human body, "so that they are inseparable from the form and operation of the work" (Salter 2010, 35). In this sense, we can evoke works that simulate human performative principles through computational means, for example, when consider *walking* as an artistic strategy that can be computationally reinterpreted as a form of explorative behavior. According to Bunt (2012), both "conceptual code and lived walking practice" share the same interests: in their procedurality, repetitiveness, and dialectic between conceptualism and unthinking mechanism. Both coding and walking entail continuous events. However there is a "different experience of event", since, in coding, events relate to a sequence of "precisely timed instructions" and, in walking, to the recognition of (often) "uncertain or unpredictable occurrences" (Bunt 2012, 7), reflecting a duality between the mapping of possibilities and the freedom of choosing how to explore them.

Walking was primarily used in arts by the *Situationist International*, according to "a technique of rapid passage through varied ambiances involving playful-constructive behavior and awareness of psychogeographical effects" called *Dérive* (Debord 1956). This kind of explorative walking practice implies a reconceptualization of space and of its experience, developed in time as an activity that demarcates itself from the classic notions of journey and stroll, by emphasizing playfulness and a new way of navigating a space and gathering data about its structure.

One of the artists involved in experimental walking is Richard Long, who approached this method as a "means to explore relationships between time, distance, geography and measurement" (O'Rourke, 2013, 49). This kind of strategy also entails a form of inscription or mapping, as the artist draws the shape of his itinerary on a map and then executes it, leaving a trace of his trajectory. Similarly to the *Dérive*'s psychogeographic notations, the trace of Long's walks, works as "both map and path" where the act of drawing presupposes time as an event (O'Rourke 2013, 49).

Projects like the *Webstalker* (I/O/D, 1997) computationally incorporate and reinterpret these strategies. Being configured as an experimental browser or a kind of mechanism that visualizes the link structure of the web in an abstract manner, the work analyzes webpages and then maps their hyperlink structure in a dynamic graphic map as the result of the user's navigational activity. And the role of the map is to provide an alternative view

Fig. 4. *John Henry Von Neumann* (Chandler McWilliams 2009).

1. https://vimeo.com/5582663

Fig. 5. *Walk* (Socialfiction.org 2004).

Fig. 6. *Matarisama* (Masahiro Miwa 2002).

of a space's structure. Revealing "the way a browser works rather than actually working as a browser" (Frieling 2003), it can be seen as an alternative kind of *dérive* deployed in the computational realm, through the mapping of an exploratory navigational activity.

4.2 FROM CODE TO HUMAN PERFORMANCE

While the previous examples emphasized walking and mapping as strategies, ultimately deployed through computational means, other experiments reverse this logic, by transposing the execution of computationally defined procedures to the physical realm. This possibility is explored in the *John Henry Von Neumann* (McWilliams 2009)[1] performance piece that presents a human (using a pen) and a computer (using a plotter) competing in order to execute the same algorithm. Random numbers are delegated to both entities resulting in two algorithmic drawings, one done by hand and the other by the machine. The instructions contain "the logic of program operation" and, as a conceptual approach to code, the piece reveals how they can be "open to interpretation by different readers, weather human or machine" (Berry 2008).

Another example that reflects on the concept of action scores and on "the modern computer in its earliest incarnation of only an imaginary, theoretical apparatus in the shape of the Turing Machine" (Cramer 2003) is *.Walk* (2004) by Socialfiction.org. This algorithmic psychogeographical piece, entails a "representation of some idealized form of computer code" (Berry 2008) that is meant to be readable and executable by humans.

Similarly, another piece that reverses algorithmic strategies onto the physical realm by means of human performance is *Reverse Simulation Music* (2007) by Masahiro Miwa. It is a music methodology that comprises "acoustic events born of intentional human actions" defined according to computer simulation-based trials (Berry 2008).

The three examples draw attention to the mentioned "translational quality" of code and to its "dual existence" as human-readable "delegated code" and machine-readable "prescriptive code" (Berry 2008), therefore also revealing the differences between computational automated execution and human interpretation of the prescribed instructions. For instance, when comparing human and machine execution in *John Henry Von Neumann*, we realize that the first entails a slower process, visible through the length of paper used in the final drawing, in which the nuances of human execution are recognizable. These differences in interpretation can also be observed in *.Walk* or *RSM*. Although the

activity implied in the first is more explorative, and that of the second, a more automatic process, both examples underline that the human execution of algorithms is not "a passive cloning of conventional circuitry, but rather (...) a creative re-interpretation" (Berry 2008).

These strategies reveal how the "open gaps" inherent to their procedural instructions are "filled in" through the human interpretation of algorithmic procedures; highlight their nature as "performative rather than compositional" events (Berry 2008).

4.3 INTERACTIVE PERFORMATIVITY

Returning to Salter, we can stress the idea that new media arts "embrace the dynamic, real-time event that has always differentiated performative practices from the static objecthood of the visual arts" in what he considers to be "a logical step" towards "discovering (or recovering) felt experience, situated context and polysensory affect" (Salter 2010, 21). This shift relates to a growing interest in the use of technology as an "innovative creative expression", which also reflects how "new technologies" appear to have "suddenly created a horizon of aesthetic experiences with no previous historical precedent" (Salter 2010, 21). In line with this view, Interactive Art emerged as a practice concerned with "processes" and "activity over [sensory] result" (Kwastek 2009). This focus on the interactive process itself is also evoked by Golan Levin's notion of "interactive performativity", referring to artworks that encourage the audience "to collaborate with the system's author in exploring the possibility-space of an open work, and thereby to discover their own potential as actors" (Levin 2010). Similarly, Boissier's (2004) notion of "exercise" draws attention to the "performative dimension of experience" of a work that is performed by its spectators.

This idea is reflected in works that exhibit dynamic behavior, by responding or adapting in real-time, when creating an interactive aesthetic experience that involves liveness and incorporates the human presence in the enactment of the work as a performance.

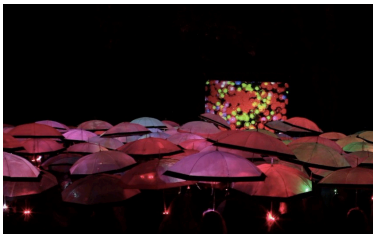
Projects like *Rain Room* (Random International 2012)[2] offer visitors the experience of interacting with an artificial system, by presenting a responsive field of falling water that pauses the rain wherever a human body is detected in the installation space. Performativity is implied more on a computational, rather than human level, since the system detects human presence and reacts to it as a live event.

Fig. 7. *Rain Room* (Random International 2012).

2. http://random-international.com/work/rainroom/

3. https://vimeo.com/67691035

Fig. 8. *Up: The Umbrella Project* (CSAIL and Pilobus 2013).



4. http://www.flong.com/projects/ifp/

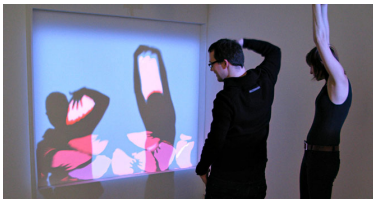


Fig. 9. *Interstitial Fragment Processor* (Golan Levin 2007).

In turn, the interactive performance *UP: The Umbrella Project* (CSAIL and Pilobus 2013)[3] is defined as a collaborative happening in which the participants control a color-changing umbrella that influences a moving image projected on a screen, which evolves and adapts according to the actions and interactions of the participants. In this case, it is the human performance that is emphasized and mediated through the live responsive behavior of the system, which, in this manner, contributes to the overall performance.

Finally, the *Interstitial Fragment Processor* (Levin 2007)[4] proposes an interactive aesthetic experience in which the negative spaces drawn by the shadow-playing of participants originates positive forms that acquire sounding properties, being that "their accumulations reveal histories of performance and play". So, this example articulates and underlines both the human and the system's performance, through the exploration of its creative possibilities on an individual or collaborative level.

With their different strategies, these works then entail multiple notions of performativity, through the interplay between systems and audience, while bringing to the fore the system's reactive agency to the presence, actions, and performance of the participants. Therefore, these examples also entail "felt experience" and "situated context" (Salter 2010, 21), while involving and articulating both the performance of system and human participants in the actualization of the work. In this manner, they also reveal the expressive use of real-time computation in creating their meaning and experience, as an overall performance and momentum of aesthetic experience.

5 CONCLUSION

By discussing these different understandings and examples of performativity, this paper sought to promote a reflection on the creative and expressive role of the human and computer as enactors of the work, whether working independently or dependently from one another. In their diversity, the approaches discussed range from the use of computation as a means to simulate human performativity, or reversing computational procedures by means of human performance, while also encompassing the interactive performativity of both human and artificial systems.

On one hand, the exploration and combination of rule-bound computation and human interpretation highlights the creative potential of code not only inside, but also outside of the computer. On the other hand, while some works explore and reveal how the nuances of human interpretation and execution can be incorporated and become expressive, other projects stress the combination of the qualities of both technological systems and human performances.

In conclusion, we can say that the works discussed promote an understanding of how procedurality, as the ability to execute rules and produce expressive and, eventually, unexpected results, becomes conceptually relevant as an artistic argument, within different performative practices and also different kinds of performativity. Going from human performance to code and approaching the performativity of code through human performance, these projects draw analogies between human and artificial systems, ultimately, invoking the notion of interactivity performativity through the interplay between both agents. With their different strategies, they emphasize procedurality as their shared quality and as an inherent quality of performativity.

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