# UNFOLDING AND UNWINDING, A PERSPECTIVE ON GENERATIVE NARRATIVE.

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## Abstract

Aesthetic artifacts produced by computational systems are characterized by how their computational traits and procedural nature become conceptual foundations and aesthetic focuses. These artifacts are strongly multimodal. The sensorial modalities through which they are formed and conveyed are more than aesthetic or communicational resources; they also mediate the logical and mathematical structures of the artifacts' processes. The methods through which human cooperators in the aesthetic cybernetic aesthetic experience build an awareness of the processes within the artifacts depend on human perception and on processes of simulation that we can describe as an added, procedural, modality. This complements and expands those sensorial modalities on which it is dependent, but unlike them it is a fundamentally intellectual process. Reception happens sensorially, while perception is a cognitively developed epiphenomenon. The sensorium mediates the experience of the artifact and the brain fabricates perception, developing simulations of varying accuracy that through processes of "patternicity" and "agenticity" try to reduce the sensed complexity and to anticipate the outcomes of the witnessed processes.

When we experience an artificial aesthetic artifact, we watch it perform while we simultaneously perform it. We probe its structure and draw the connections needed to participate and comprehend it. Even if unwillingly, we simulate its processes and create our own parallel sequences of probable events as the artifact unfolds. In the interaction with these systems, anticipation, the validation of simulations and the eventual violation of expectations, play a significant role in the creation of narratives or of narrative-like experiences. As with other aesthetic constituents of these systems, narrative and drama may either be hard-coded, much as they are in traditional or non-procedural media, or they may be emergent and procedural. This paper proposes an approach to how the creation of narrative can be understood in the context of performative or interactive generative systems, in an attempt to integrate in our analytical model of procedural systems the *perspective* variable, originally proposed by Espen Aarseth in his study of ergodic texts.

The outputs of artificial aesthetic artifacts fundamentally differ from what we find in most non-procedural media because, much as nature, they weren't necessarily created or even shaped by humans. These artifacts are rich with generative potential and have their own aesthetics, their unique patterns of desire, their ways of giving pleasure and creating beauty. They are inevitably mediated but also hyper-mediated, constantly confronting us with signs of what may be happening behind their modal expressions. It is this layer that marvels and allows the experience of the artifact as a symbolic drama in which we are the central protagonists.





## 1. Computational media

Computational artifacts are ubiquitous in many aspects of contemporary life, including cultural creation and consumption. When used as tools, they allow the discovery or invention of whole new work processes, but also in the simulation of previously existing tools, as universal machines, they are able to reproduce or embody any process that can be reduced to algorithms (Dyson 2012). Through this simulation they allow gains in speed and cost, often replacing many of their analog counterparts. They are also able to simulate any conventional medium that can be digitized, leading to the computerization of the media of the arts, and to their ultimate absorption by computational devices. Media become virtual, shed their materiality and go through a phased transition from matter to bits.

When computational devices act as both media and as distribution networks, their capacity to remediate (Bolter and Grusin 1999) promises unprecedented fidelity in reproduction, safety in archival and extreme portability. As a consequence, it may be no exaggeration to claim that very often media largely benefit from the transition to the computational domain.

This shift in distribution technologies is but a first stage in the transition. Computational media must not necessarily abide by the traits or limitations of conventional media. They are of a fundamentally different nature and ache to be released from those constraints, allowing non-linearity, indeterminacy and random access to be developed in scales that non-computational media are unable to achieve, due to their capacity for various degrees of autonomy (Carvalhais 2010), from their creators, contexts of creation, *readers* (Rau 2000), hard-coded information or external data-sets.

We, as creators with these media, should guide their usage with the awareness that even when acting as media, they are still capable of simultaneously becoming tools that operate on their media layers and of reshaping experience, form, content and expressiveness in runtime. They are able to transform the operational space of the arts, expanding it well beyond the field of possibilities offered by conventional media, pushing it further, breaking out and constructing new spaces. Being able to exert some judgment over the products of their operation and to reconsider past choices in deciding upcoming steps (Boden 2004), they are able to act creatively, becoming a new form of artificial aesthetic artifact.

Our work has been focused on how these artifacts propose a set of new aesthetic experiences that are fundamentally different from those of mass media, and that in many ways bring them closer to the experiences enabled by somatic message production. To this effect we developed an analytical model (Carvalhais 2011) trying to expand Espen Aarseth's textonomy (1997) for the study of multimodal computational artifacts, accounting for visual, sonic, kinetic, and other nonverbal signifiers (Hayles 2005:36). We were able to use or repurpose six of the seven original variables, but were unable to integrate the aspects depicted by the "perspective" variable, a descriptor of the reader's "strategic role as a character in the world described by the text" (Aarseth 1997:63).

## 2. Amodality and Multimodality

Before becoming sets of sensorial stimuli, computational artifacts are built from code and software. Following the MDA formal approach, we may describe this state as that of the "rules" of the artifact's *mechanics*, of its "particular components (…) at the level of data representation and algorithms" (Hunicke, LeBlanc and Zubek 2004). When the system is set in motion, a second level of *dynamics* emerges from "the run-time behavior of the mechanics acting on inputs and (…) outputs over time." Finally it follows a level of *aesthetics*, where we discover the experiences that are the goal of the system's designer and that frame the reader's point of view on the artifact.

At the levels of mechanics and dynamics, artificial aesthetic artifacts most often operate in an amodal space of possibilities, a 'proto-sensory' flux that preconditions the differentiation of the sense modalities (Hansen 2004). It is on the verge of aesthetics, when the processes are transcoded, that they are brought to physical reality and expressed through concurrent modalities. These are directly linked to the human sensorium (Whitelaw 2008), but we may expand the definition to include, as proposed by Stephanie Strickland (2007), the perception of mathematics or mathematical structures, of rhythm and harmony. We may suggest the description of a *procedural* modality, which should not be understood in the Pythagorean sense, but rather as the intuitive intellectual understanding of structure and process. We may further link it to the identification of a *design stance* in inanimate objects, or an *intentional stance* in animate objects (De Landa 1991), the first trying to discover a purpose, the later motivations or emotions.

Sensorial modalities are crossed, combined or reinforced. They aid to communicate the internal processes of the artifact and contribute to the emergence of the *procedural modality*.

## 3. Senses, perception and simulations

On the human side, reception gathers inputs and perception deduces meaning. The sensorium mediates an experience of the exterior (Bateson 1979) that is an illusion and a simulation. Perception is an epiphenomenon (Hofstadter 2007:93), a large-scale illusion that never exists through sensory channels, but is *fabricated* by the brain (Damásio 2003; Eagleman 2011) from an external world from which it is forever isolated.

The procedural understanding contributes to yet a further simulation of causal procedurality, of the processes or algorithms that originate the phenomena (Dehaene 2009). Drawing from sensorial clues, the brain tries to reconstruct the external processes, to build simulations that anticipate them. It tries to reduce the perceived complexity and to make "unfamiliar, complex patterns made of many symbols that have been freshly activated in concert to trigger just one familiar pre-existing symbol (or a very small set of them)." (Hofstadter 2007:277) It tries "to look for and find patterns" in a process that Michael Shermer calls "patternicity" (2011:5).





A simulation is, in principle, unable to tell us anything we do not already know, being no better than the assumptions built into it (Simon 1969:15). It is however, plausible that a simulation based on an incomplete or even an erroneous set of data may provide new knowledge; by abstracting the details from a set of phenomena, it may find a faster way towards a simulation, not needing to know "all the internal structure of the system, but only that part of it that is crucial to the abstraction." (16) Therefore, incomplete or abstracted simulations can provide relevant data to be integrated in models, contributing to a continuous process of refinement. If and when simulations can be compared between/among themselves and with the external phenomena, the process can be accelerated through the selection of models that produce better predictions. The external phenomenon is used as a fitness function, with correct anticipation taken as proof of successful simulation, and corroboration of the acquired knowledge.

Furthermore, simulations may produce seemingly accurate results despite being based on false assumptions, developing processes that although dissimilar to the originals, happen to produce similar patterns of outputs. If the results are accurate and frequent enough, they may therefore be judged as correct. This is what we find in the so-called "Eliza effect", caused by the susceptibility to read far more understanding than is warranted in the sensorial manifestations of computational devices (Hofstadter 2007:157).

## 4. The Eliza effect

The Eliza effect was named after a program written by Joseph Weizenbaum in the mid-1960s (Hofstadter 1995), an artifact where reportedly it was often experienced (Goffey 2008:133). It is caused by erroneous simulations that lead to the projection of traits like sentience and personality onto systems that are unable to develop them, because these traits are often the best and most readily available models for the phenomena.

The effect can be understood as the outcome of: 1) the anthropomorphization of technology (Reeves and Nass 2002); 2) the concealment of the artifact's inner processes; 3) the strong effect of surprise (Barratt 1980) in interaction with computational systems; and, 4) the development of *theories of mind*.

We frequently resort to this last strategy when trying to interpret humans or other beings endowed with a mind (regardless of its perceived complexity), and we naturally fall back to the same approach when facing complex systems like some computational artifacts. Upon finding patterns, the brain adds meaning to them, developing a process of "agenticity" (Shermer 2011). It tries to understand how a system behaves by trying to get "into [its] mental shoes" (Metzinger 2009:176), to 'think' as it does, to operate along the same lines, i.e., to simulate it.

## 5. Reversing MDA: From the Viewpoint of ADM

The high processing speeds of artificial aesthetic artifacts, their procedural complexity and their opacity, create strong barriers to their comprehension. During interactions with these artifacts, their behaviors are simulated and predicted. Originally encoded as *prescriptive* rules at the artifact's mechanical level, as the processes unfold, the human interactant predicts outcomes by elaborating *descriptive* rules and builds anticipation as to whether these will be proven correct or not be confirmed. The intellectual tension that results from this process is the foundation for the emergence of narrative, aesthetic pleasure and even drama, as defined by LeBlanc (2006), and it is from this perspective that the reader starts reversing the MDA framework. (Hunicke, LeBlanc and Zubek 2004)

As with any other message, narrative and drama may be hard-coded and reproduced, with predefined acts, arcs, stable situations and accidents, events, goals, protagonists, antagonists and hosts of other characters (Bartle 2004), but when this happens, the artificial aesthetic artifacts are used as conventional media, not taking advantage of their added capabilities but also resigning their potential for procedural authorship (Murray 1997).

Where elements of a conventional narrative do not exist and simulations are developed, a narrative experience may emerge from the tension between simulation and validation, from probing and mapping the logical depths of the artifact (Gleick 2011). Artificial aesthetic artifacts can therefore be 'flat', failing to grow, change or significantly develop during their experience, or they may be 'round', able to react to conflict or other stimuli, allowing themselves to be changed and, in doing so, frequently violate our expectations.

This 'roundness' and the creation of large patterns as a result of many smaller effects is one of the singular attributes of living systems (Murray 1997:93). Throughout human history, these were found in the natural world, not in the realm of the artificial, which was for the most part characterized by predictability, stability and repetition. Artificial aesthetic artifacts, however, often behave less like conventional media and more like people, animals, or other complex natural systems that cannot be understood solely through the study of their mechanical components. Therefore, they force us to develop convoluted simulations that also need to take into account the levels of referential information surrounding a system.

## 6. Drama and narrative

Emerging from an amodal space of possibilities, processes are mediated by and through the artifact. After reception and perception, they once again become amodal or metamodal (Morbey and Steele 2009) and are found in a new abstract domain. The procedural capacities are the key to our identification of amodal characteristics in the perceived phenomena, as they are at a later stage fundamental in the process of simulation.

This understanding of processes and their simulations is not always straightforward, because there isn't necessarily a direct mapping between the mechanical level and its aesthetic manifestations. Morphogenesis is generative (Carranza 2001), hence there is no blueprint, only constraints (De Landa 1997), and the reader is thus left with sensations, perceptions and symbols below which s/he is unable to peer.





Artificial aesthetic artifacts fundamentally differ from conventional media because they aren't necessarily created or even shaped by humans. They are rich with generative potential and have their own aesthetics, their unique ways "of giving pleasure, of creating beauty" (Murray 1997:94). They are inevitably mediated but also hyper-mediated (Bolter 2001), constantly confronting us with signs of what may be happening behind their modal expressions. It is this layer that truly marvels and that allows the experience of the artifact as a symbolic drama in which we are central protagonists.

## REFERENCES


Aarseth, Espen J. *Cybertext: Perspectives on Ergodic Literature*. Baltimore, MD: The Johns Hopkins University Press, 1997.

Barratt, Krome. *Logic and Design: in Art, Science & Mathematics*. Guilford, CT: Design Books, 1980. 1989.

Bartle, Richard A. *Designing Virtual Worlds*. Berkeley, CA: New Riders, 2004.

Bateson, Gregory. *Mind and Nature: A Necessary Unity*. New York: E. P. Dutton, 1979.

Boden, Margaret A. *The Creative Mind: Myths and Mechanisms*. 1990. Second ed. London: Routledge, 2004.

Bolter, Jay David. *Writing Space: Computers, Hypertext and the Remediation of Print*. Second ed. Mahwah, NJ: Lawrence Erlbaum Associates, 2001.

Bolter, Jay David, and Richard Grusin. *Remediation: Understanding New Media*. Cambridge, MA: The MIT Press, 1999. 2002.

Carranza, Pablo Miranda. "Self-design and Ontogenic Evolution." Generative Art. Milan, 2001.

Carvalhais, Miguel. "Towards a Model for Artificial Aesthetics: Contributions to the Study of Creative Practices in Procedural and Computational Systems." Universidade do Porto, 2010.

---. "Procedural Taxonomy: An Analytical Model for Artificial Aesthetics." *ISEA 2011, 17th International Symposium on Electronic Art. Istambul, 2011.*

Damásio, António. *O Sentimento de Si: O Corpo, a Emoção e a Neurobiologia da Consciência*. Lisboa: P.E.A., 2003.

De Landa, Manuel. *War in the Age of Intelligent Machines*. New York: Zone Books, 1991. 2003.

---. *A Thousand Years of Nonlinear History*. Brooklyn, NY: Zone Books, 1997. 2005.

Dehaene, Stanislas. *Reading in the Brain: The Science and Evolution of a Human Invention*. New York: Viking, 2009.

Dyson, George. *Turing's Cathedral: The Origins of the Digital Universe*. New York: Pantheon Books, 2012.

Eagleman, David M. *Incognito: The Secret Lives of the Brain*. New York: Pantheon Books, 2011.

Gleick, James. *The Information: A History, a Theory, a Flood*. London: Fourth Estate, 2011.

Goffey, Andrew. "Algorithm." *Software Studies: A Lexicon*. Ed. Fuller, Matthew. Cambridge, MA: The MIT Press, 2008. 15-20.

Hansen, Mark B. N. *New Philosophy for New Media*. Cambridge, MA: The MIT Press, 2004.

Hayles, N. Katherine. *My Mother Was a Computer: Digital Subjects and Literary Texts*. Chicago, IL: The University of Chicago Press, 2005.

Hofstadter, Douglas R. *Fluid Concepts and Creative Analogies: Computer Models of the Fundamental Mechanisms of Thought*. London: Allen Lane, 1995.

---. *I Am A Strange Loop*. Cambridge, MA: Basic Books, 2007.

Hunicke, Robert, Marc LeBlanc, and Robert Zubek. "MDA: A formal approach to game design and game research." *Challenges in Games AI Workshop, Nineteenth National Conference of Artificial Intelligence*. San Jose, CA, 2004.

LeBlanc, Marc. "Tools for Creating Dramatic Game Dynamics." *The Game Design Reader: A Rules of Play Anthology*. 2005. Eds. Salen, Katie and Eric Zimmerman. Cambridge, MA: The MIT Press, 2006. 438-459.

Metzinger, Thomas. *The Ego Tunnel: The Science of the Mind and the Myth of the Self*. New York: Basic Books, 2009.

Morbey, Mary Leigh, and Carolyn Steele. "Beyond the Remix: Clarifying Mastery in Virtual Environments." *Media in Transition*. Cambridge, MA, 2009.

Murray, Janet H. *Hamlet on the Holodeck: The Future of Narrative in Cyberspace*. Cambridge, MA: The MIT Press, 1997.

Norman, Donald A. *Things That Make Us Smart: Defending Human Attributes in the Age of the Machine*. New York: Basic Books, 1993.

Rau, Anja. "Wreader's Digest: How to Appreciate Hyperfiction". *Netzliteratur*. 2000. Web. 3/2/2010.

Reeves, Byron, and Clifford Nass. *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places*. 1996. Stanford, CA: CSLI, 2002.

Shermer, Michael. *The Believing Brain: From Ghosts and Gods to Politics and Conspiracies — How We Construct Beliefs and Reinforce Them as Truths*. New York: Times Books, 2011.

Simon, Herbert A. *The Sciences of the Artificial*. Cambridge, MA: The MIT Press, 1969.

Strickland, Stephanie. "Quantum Poetics: Six Thoughts." *Media Poetry: An International Anthology*. Ed. Kac, Eduardo. Bristol: Intellect, 2007. 25-44.

Whitelaw, Mitchell. "Synesthesia and Cross-Modality in Contemporary Audiovisuals." *Senses & Society* 3.3 (2008): 259-276