

# The Status of Interactivity in Computer Art: Formal Apories

Conceptual constraints in the production of artistic works via computing systems with interactive devices.

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## ABSTRACT

Contemporary art, particularly that which is produced by computer technologies capable of receiving data input via interactive devices (sensors and controllers), constitutes an emerging expressive *medium* of interdisciplinary nature, which implies the need for a critical look at its constitution and artistic functions. To consider *interactive art* as a form of artistic expression that files under the present categorization, implies the acceptance of the participation of the spectator in the production of the work of art, supposedly at the time of its origin / or during its creation. When we examine the significance of the formal status of interactivity, assuming as a theoretical starting point the referred premises and reducing it to a phenomenological point of view of **artistic creation**, we quickly fall into difficulties of conceptual definitions and structural *aporias* [1].

The fundamental aim of this research is to formally define the status of *interactive art*, by perpetrating a phenomenological examination on the creative process of this specific art, establishing crucial distinctions in order to develop a hermeneutics in favor of creation of new perspectives and aesthetic frameworks.

What is interactive creation? Is interactivity, from the computing artistic creativity point of view, the exponentiation of the concept of the open work of

art (ECO 2009)? Does interactive art correspond to an *a priori* projective and unachievable *meta-art*? What is the status of the artist and of the spectator in relation to an interactive work of art? What ontic and factual conditions are postulated as necessary in order to determine an artistic product as co-created? What *aporias* do we find along the progressive process of reaching to a clarifying conceptual definition?

This brief investigation will seek to contribute to the study of this issue, intending ultimately, and above all, to expose pertinent lines of inquiry rather than to provide definite scientific and aesthetic answers.

**Keywords:** *Computer / Digital Art, Interactive Creation, Interactive Art, Interactivity, Interactive Devices, Intentionality, Phenomenology.*

## I. INTRODUCTION

The artistic object, considered in its functionality as a formal manifestation of a content that is revealed through a form of expression, is structurally anchored to the creative process that generates it. Therefore, to achieve an understanding of the range and internal structure of a work of art implies analyzing and delimitating to what extent the creative process that generates the work determines it, and

how the creative process sets down complex forces and interrelationships between the actors of the creative process scenario: the artist, the material & form of expression (the work), and the spectator. Consequently, and due to the peculiar nature of interactive art, the goal of this paper is to conduct a critical analysis in order to figure how the artistic interactivity can be conceptualized within the computational / digital arts.

The interactivity one can observe on computing / digital art works, and in particular those that are produced for real time interaction [2], implies the intervention or participation of the public (spectator[s]). This form of *human-machine* relationship is realized through the interaction with external devices that are receptors of coordinates which translate into numeric calculations (a *data flow*) that in turn correspond to events / artistic results. This kind of artistic creation has been increasingly integrated in contemporary art, but lacks a cohesive source of reflection that clarifies the implications of these new intertwined approaches. Among the listed causes that might justify the configuration of such a situation we, firstly, propose the fact of the temporal novelty of these artistic activities and, secondly, a certain form of cultural reaction or *misoneism*, promulgated by cultural / artistic dominant elites (*intelligentsias*) in western societies, which results in the lack of deep and serious discussions within the artistic communities, about the new problematic artistic dimensions. Computer art probably is (and within it interactive art), as no artistic genre before, highly dependent on a reconfiguration of the concept of art as *techné* [3], i.e. as a technique. Because this kind of art is, simultaneously, cause and effect of a peculiar *know-how* that is truly of a technical nature. Computer art is responsible for refiguring the world of contemporary artistic creativity, implying consequences and aesthetic transformations, both in terms of artistic production and reception / aesthetic contemplation. In order to sharpen the focus of this analysis, we should briefly analyze aesthetic perspectives that will allow us to set up a proper framework for this subject.

## II. CONTEXTUAL AESTHETIC PERSPECTIVES: ARTISTIC CREATIVITY AS AN OPENING TOWARDS INTERACTIVITY.

*"The world, the real is not an object, it's a process."*  
John Cage [4] (PIMENTA 2003)

Let us begin by referring the undeniable historic importance of the artistic impact of *avant-garde* movements, which appeared during the twentieth century, such as: *Futurism*, *Dadaism* and *Surrealism*

[5]. These movements were responsible for a growing mutation of the classical conceptual meaning of art, for they proposed unusual methods and experimental practices, which emphasized the notion of artistic research and transdisciplinarity. Consequently, these movements were founded due to shared intellectual purposes that frequently materialized in social-political criticism / manifestos, resulting in creative productions of considerable disruption, if one considers the naturally conservative canons of institutional art. Throughout this process, new aesthetic theories appeared which reshaped the formal limits of the artistic object (e.g: Duchamp's *ready-made* or Schaeffer's *sound object*, of his *musique concrète*) and the conditions / foundations of artistic experience, holding as great novelty the inclusion of the spectator's participation in the creative act / process (e.g: the *Fluxus* happenings). The inclusion of the spectator in the creative process matches a relative decoupling of determinations and choices meant by the author / artist.

We proposed to conduct an examination on the formal status of interactivity, within the context of computing systems with interactive devices, and to do so we'll present a summary of theoretical approaches that, despite differing from the point we intend to demonstrate, show affinities, as they also delimit the analysis.

We will firstly present theories that imply aesthetic approaches to what we'll define as **a proactivity of the artistic reception**. Generally, what we can retain from these theories is the idea that during the creative process there is a resolution moment which is characterized by a sort of dominance of one part of the creative relationship over the other, that is, the spectator has, albeit through different ways and despite formal differences within theories, the possibility of an active creative involvement, and though being situated within the reception position, he acts as occupying the phenomenic domain of artistic creativity / production (place hitherto occupied, so utterly solipsistically, by the artist / author \_ check fig. 1, next page).

Duchamp refers, in his famous text "**Le Processus Créatif**" (Duchamp 2005), that something like an **aesthetic osmotic transfer** takes place between the artist, the matter of expression and the spectator, having the referred transfer an interactive status that not only communicates the complex artistic symbolism present in the work, as it confirms the creative role of the unconscious (non-psychoanalytic-oriented unconscious). It is well known that, due to the aforementioned theoretical implication of the osmotic transfer, Duchamp points out that the validation of the work of art belongs to the absolute scrutiny of the spectator.

Another important theoretical standpoint for the current analysis is the notion of “**Opera Aperta**,” (open work) by Umberto Eco (Eco 2009). Eco presents in his text, as an objective corollary of the concept of open work, the central idea of a **poetic of suggestion**, which refers to a *praxis* that is based on the exploration of structural ambiguity (in the negative and positive senses) [6], as opposed to the normal linearity of hermeneutic interpretation, establishing an analogy of this concept with the creation of contemporary artistic works and advocating a proactive interpretation of the spectator, stressing, therefore, that every interpretation is an execution (Eco 2009). Regarding the issue of the interpretation as a sort of proactivity, Eco argues that this idea corresponds to an epistemic primacy of the subject, the individual subject being a product of a conglomeration of existential contingencies (cultural, experiential, tastes, propensities) he has the possibility of freely interpreting the work. Consequently, the resulting multiplicity of interpre-

**participation** [8] in the work of art, emphasizing the proactivity status of perception and by postulating that **every perception is a creation** (Popper 2007), for perception has the power to both invent and to penetrate / predict reality. Popper concludes, hence, that there are no functional constraints in terms of the participatory and creative power of human consciousness. The epistemic dimension of the human being is, accordingly, a creative act in itself, considering its sensitive apparatus as the producer of the world. In a parallel argumentative foundation, we can not fail to mention that this position has affinities with the vision expressed in the transcendental aesthetics of “the **“Kritik der Reinen Vernunft”** (Critique of Pure Reason) (Kant 2001), i.e, the Copernican Revolution [9].”

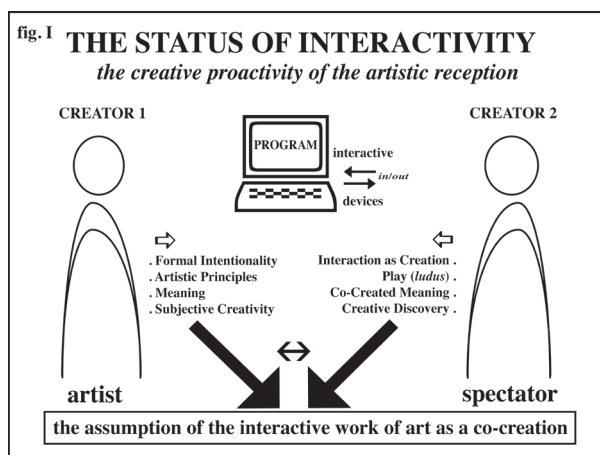
The exposed theoretic approaches appear to us within the light of an aesthetic of proactivity, regarding the reception of works of art, underlying the emphasis, more than legitimate, of interactivity being the result of relationships between the elements of the creative process, forgetting the point of view of the phenomenon itself as a **productive act**, dismissing what seems to be the strongest argument, and from which we will proceed to our analysis: **the creation**, i.e, the artistic production regarded **as causal force**, as the formal logical starting point out of which we will perspective the status of interactivity.

### III. INTERACTIVITY AND ARTISTIC CREATION: CONCEPTUAL DELIMITATIONS.

Before entering the core of the apories, it's important to define the conceptual array that we'll use in order to clarify the precise meaning of the involved concepts and arguments we will weave.

Let's start by defining what we understand by interaction and interactivity. The word interaction suggests the advent of a reciprocal act or agency, as if it implied a joint action by two or more elements (this action may hold the same formal purpose or diverge towards the end of the performed action). There is another definition of interaction which seems important to emphasize, the dialectic domain between a stimulus and its response, i.e, the impulse that manifesting itself as denoting an act, poses as a proactive behavior and sparks in its course a similar phenomenic behavior by another subject / object. Interactivity is, in this perspective, considered as a set of actions that are the act, cause and effect of various interactions, always considered as **interdependent schemes of causality**.

Subsequently, and because we focus on art's domain, we shall clear from what perspective we'll base our examination, regarding this concept. The



1 | DIAGRAM I - Interactive art status: the creative proactivity of the artist reception.

tations realized by several subjects about the same work of art would correspond to the reverberation of the virtual polysemic richness of its content, and simultaneously the work would remain untouched, in its original artistic intent, as it would always allow fresh and new aesthetic fruitions.

Another pertinent conceptual approach to briefly refer to is expressed by Frank Popper in the book: “**Art, Action et Participation - L’Artiste et la Créativité.**” Popper scrutinized works of relevant artistic groups (such as G.R.A.V. - Groupe de Recherche d’Art Visual) [7] to expose the pragmatic notion of *desire for the game* (the game as a constitutive need of the human being) and the strong notion of the spectator as an agent directed towards a **total**

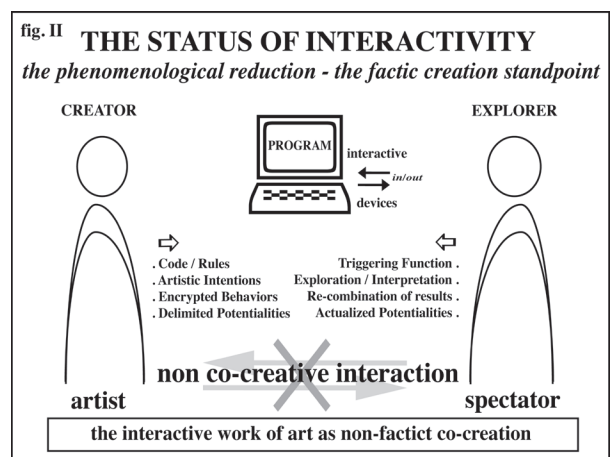
term art (from the Latin ars [artis]) implies a certain know-how that unfolds into the experience of feelings, such as enjoyment or repulse. From the varied meanings / contextualization that the term suffered since classical antiquity, the common denominator in all definitions of art can be stated in the following synthetic formulation we suggest: **art consists on the creation of objects and / or acts that intend to proportionate an aesthetic experience.** The aesthetic experience is inseparable from the idea of beauty and sensible / rational fruition. However, in a more descriptive definition, we can stress that art has a major role in human cultures as it functions as the flow of human expression through spatial and temporal forms of representation. Art is responsible for the communication of human inner life and imagination, revealing and reflecting, through playful or transcendent ways, things as: ideas, desires, anxieties, problems, ideals, paradigms, questions and epochs. We shall finish this brief introduction with two lexical conceptual definitions of utmost importance: **Creation and Creativity.** The term creation implies functionally, and among many ideas, the concept of origin or genesis. In practical terms the concept of creation implies **the idea of an act as a producer of a particular object or entity** (PIRES 1991). By reducing the concept of creation to its most essential premises we find the idea of **free causality** and the creative act as corresponding to a **free act of the will.** Creativity, thence, can be considered as the potential endless modes of expression of the creator(s) act(s), which correspond to the multiple meanings and modulations of representing the form.

**IV. INTERACTIVITY AS A TRUTH-FUNCTIONAL ALIENATION OF THE CREATIVE ACT / PROCESS: FORMAL APORIES.**

If we consider creation as a free act of the will and if we accept that the product of creation is a determined work (or creature), then we must admit that between creator and creation there are insurmountable constraints of ontic nature, even if they present themselves under different formalizations or distinct functional features. Ultimately, what is at stake here is the accountability of a finite list of determinations with defined and precise constrictions. Thus, and considering the artistic act, we have to postulate a causal relation of dependency, due to the decisions of the creator (author/artist), which formally and inescapably enroll in the work's (or "creature") potential or actual meaning. Consequently, the causal link that exists, in terms of dependence and formal factic constraints, is univocal and irreversible, for it has just one direction: from the creator to the work and never (in natural conditions) from the work to

the creator. Hence, the creator / artist, applies the rules of the constitution of the work through a precise code, creating a complex field of potential situations that could be actualized (check fig. II). This field of possibilities will be, hereinafter, named program. Having defined the assumptions that are essential for realizing our examination, we still have to note a relevant distinction between: endogenous interactivity and exogenous interactivity, stating that our approach on the status of interactivity will focus on the grounds of the latter conceptual approach. The structural difference between them is clearly exposed by Couchot and Hillaire, in "**L'Art Numérique - Comment la Technologie Vient au Monde de L'Art.**" (COUCHOT, HILLAIRE 2003).

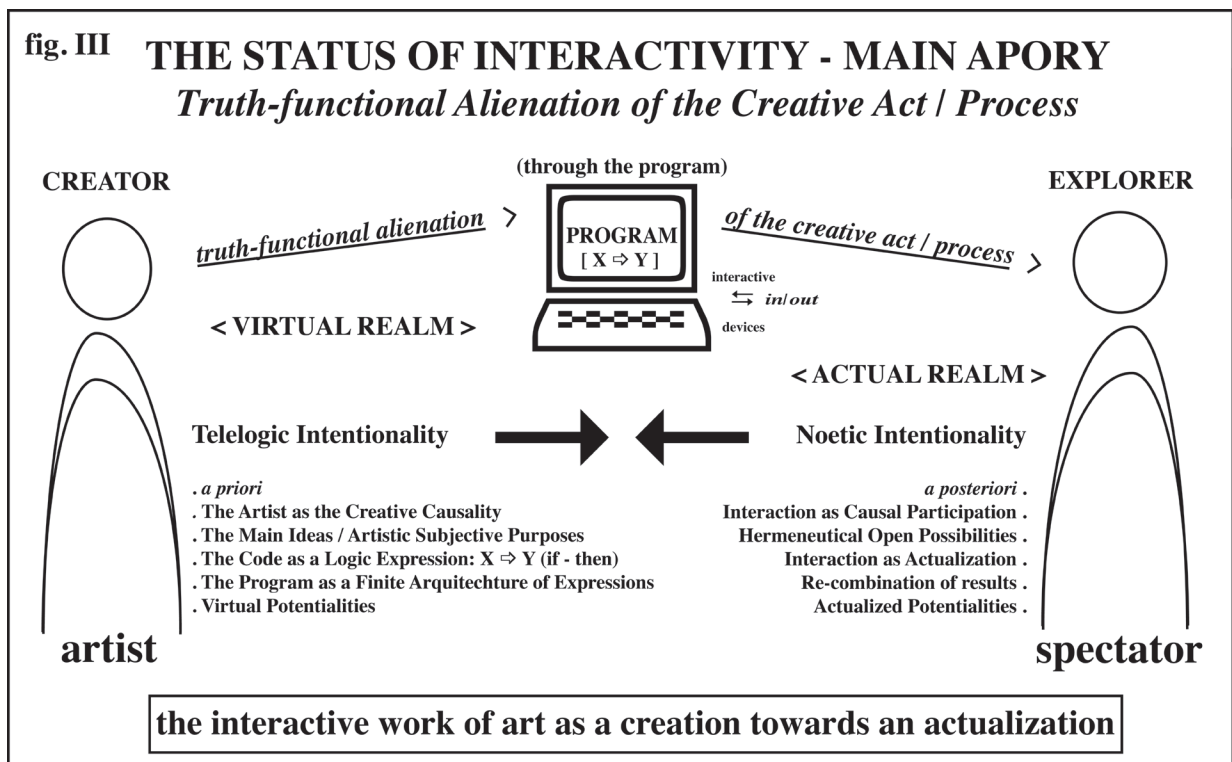
It is understood that endogenous interactive art is that which concerns the creation of closed environments, where programs created by algorithms calculate internal events that do not answer to external stimuli, which can not influence the course of the



**2 | DIAGRAM II - Interactive art status: the phenomenological reduction - The factic creation standpoint.**

interactivity. The exogenous interactivity lies in a direct interactive relationship between the spectator, which is located in an outside plane, and the computer programs. Such relation consists in variegated modal (or multi-modal) mapping of parameters and spatial positions (coordinates of proximity, light index, pressure index, etc...) in a given compound, or physical location (COUCHOT, HILLAIRE 2003). In order to exist a relationship between interior and exterior we'll have to postulate as absolutely necessary the existence of an interface that allows, despite the complexity and variety of represented processes, such a connection.

Any artistic work produced via computing systems with interactive devices profiles as being the result



3 | DIAGRAM III - Interactive art status: the truth-functional alienation of the creative act/process.

of a program, performed by a specific code(s). One can designate the term code to any kind of language designed for the purpose of producing functions of numerical calculation. In this sense, and as technological developments have made it possible to perform operations of DSP (Digital Signal Processing) on personal computers (late nineties), software like: Max-MSP, Pd, SuperCollider, C-Sound, began to proliferate because, by holding open modular structures, they are appropriate to the creation of such programs [10]. It is now important to define what, in formal terms, is considered a code, chopping the paths that will lead us to the presentation of our core argument. A code is a communication system composed by specific symbols and signs, regulated by a set of rules that determine its conjugating possibilities and semantic uniqueness. Computer systems and programs are mathematical architectures of code, and if they are reduced to their most essential premises we find, among other elements, the logical-formal proposition of the **implication** (the conditional), described as **if -> then**, that is formalized as follows:  $X \rightarrow Y$  (if X occurs then Y will also occur.) We should consequently note that any program that is coded (exceptions will be handled in the next chapter), for example, to generate an audiovisual installation or performance, despite the used code or platform, disregarding the complexity of the selected processes (being limited or not

to chance or randomization algorithms) and also in contempt of the multiple modulations of its exogenous reconfigurations potential, by the moment it's finalized it results in effects or artistic events, that although carry a novelty and "unexpected" character (on the differentiated expression of binary data reorganization / recombination implicated by each new interaction with the same program), all these artistic results remain determined, in their full possibility, *a priori* within the written code and are enrolled in the program as potentialities to be actualized. Therefore, we will define the central apory which we consider the result of the examination so far: the positioning of the artist regarding the creation of the interactive work is equivalent to a **creative truth-functional alienation** of the activation (the triggering) of interactive events, which reside within the programmed code (check fig. III). Accordingly with the abovementioned, the artist transfers to the spectator the responsibility of updating the *a priori* envisaged scenarios in the program. On the one hand, his status is of a creator that moves away from the generated creature (or the coded work), on the other hand, he delegates the logical truth value [11] of updating of virtual possibilities to the spectator, passing the function of interaction, determining and conditioning in advance the real creative possibilities of the spectator, hence, severely phenomenically limiting his freedom. Pierre

Lévy stated a cross distinction that must also be referred: between virtual and real, which corresponds, by analogy, to potential and actual. Formally, the interaction exists at an ulterior stage, beyond the time of the creation of the laws that regulate it, that's the reason why the interaction is nothing more than a phenomonic actualization of virtual possibilities. The fact that interactivity verifies itself, due the concrescence of actualization, does not mean that this event, which arises from the range of possibilities (or from the well of the virtual world enrolled within the program) is considered as a possible depletion of the programmatic complex, i.e, the node of trends / forces that accompanies a given situation or entity (LÉVY 2001). The virtual is for potential as the reality is for actuality.

It is worthwhile mentioning that, within this formal framework, the spectator has his "creative" participation reduced to a player in the "dark" (WEISSBERG 2006), being the interaction or multimodal modal, he is nevertheless experiencing a process of *ludus* (derived from the Latin, meaning game), of game, while searching for meaning as he explores and actualizes the work.

We haven't designed this venture to deny the evidence of interaction within the computing arts, it exists, but can it be considered creative? If yes, in what terms? If not, why?

We shall present an analogy in order to strengthen the understanding of the exposed *apory*: **the creation of legislation**. Writing a specific law implies, functionally, to preview exceptional cases that also integrate its constitution, which, in turn, correspond to reconfigurations of the primary content indicated by the law. Hence, the law is considered in its general formulation (being this the applicability in most of the cases), and in particular or contingent formulations (in exceptional cases). Nevertheless, and considering a civil law (that concerns all citizens in general) the subordination to the law is horizontal and universal, i.e, despite the formulation and modality of applicability, the law corresponds to an absolute regulatory imposition, acting as a totalizing imperative, the citizen remains in a position of total subjection towards the law (in a position of obedience) and his freedom is limited by its existence. The fact that the citizen is subjected to the law determines that he is regulated instead of independently or truly regulating himself. It follows that, in this analogy, as in the case of artistic interactivity, only the legislator (creator) is a free agent, because he creates and encrypts the constraints or rules that unveil in a formal syntax that subjugates every citizen.

Thus, and finally, to consider creative and co-authorial the process of a game in which actualizations of *a priori* possibilities occur, due to the spectator's

actions (such as the trigger-mapping body, spatial-temporal agency, etc.) is, in the phenomenological reduction perspective, a conceptual mistake that we can not fail to stress.

## **V. TOWARDS THE REFORMULATION OF THE FORMAL STATUS OF INTERACTIVITY: THE DIALECTIC TRINOMIAL (ARTIST - WORK - SPECTATOR).**

Having exposed the core of our argument, the central apory of the truth-functional creative alienation, let us now specify a few distinctions to fully clarify the interpretation of the dialectic artistic trinomial in question, namely: artist, work of art and spectator. Two planes must be distinguished, which correspond to two intentional modalities [12] present in the truth-functional creative alienation: 1st) - **Teleologic Intentionality** [13], 2nd) - **Noetic Intentionality** [14]. The teleologic intentionality expresses the artistic questioning and intentions meant by the author with the creation of the work of art, including the set of connections of potential events, determined by the programmed code, and above all the main artistic purpose corresponding to his subjective artistic intent (hence the idea of the *telos* [literally meaning end in Greek], i.e, the main finality or purpose of the work). The noetic intentionality comprehends the artistic referred sense of the game, of the discovery of the work of art, as it consists on the results of the participation and interaction of the spectator with the work of art. Being the results by nature inedited, since they are always dependent on the new re-combinations of the same elements disposed by the teleologic intentionality, the noetic intentionality emerges as the process through which the spectator interprets THE (or a) meaning of the work of art. Regarding the noetic intentionality, we can advance that it corresponds to a kind of proactive interpretation by the spectator in an open manner, as above-mentioned, resembling Eco's *poetic of suggestion* (Eco 2009) [15].

Considering the artistic creation point of view and the impasse that the analyzed apory sketches, we can only figure a parity of position between artist (author) and spectator if the production conditions of the work were truly the result of an actual cooperation, towards a "fusion of free causalities", assuring that the premises of the work were decided and coded by both "creators". As this situation does not apply, for it's not possible to affirm that artist and spectator equally influence and co-create the work of art, we can't envision easy solutions of this apory. However, and continuing our analysis, we pondered a first situation that would dissolve the apory, a kind of exceptional situation that would demolish the referred constraints: **a system error**. This error could

be caused by the spectator's experimental exploring and interaction with the work or by a flaw in the programming of the code. The artistic result of the error would imply something like a suspension of pre-determined number of virtual nature events, creating representations and results that would not be in any way predicted or intended by the author, or even by the spectator (although an error is, in itself, a categorical possibility for whatever generated object or program, hence, also *a priori*). The second possibility we figured as an hypothetical solution to this quandary would be the creation or inclusion of any intermediary entity, that would stand between the spectator and the work, in order to register his participation not as a potential actualization of virtual events, but as a participation that would alter the established paradigms, rules and functionalities of the coded program. That entity would have to correspond to a kind of translator program / legislator that could be paired with the coded program by the artist and which, simultaneously, was capable of overcoming the technical condition of ignorance in which the spectator stands [16] before the system that regulates the experienced work of art, allowing, consequently, the result of the spectator's interaction with the work to freely determine rules concerning the allocation of artistic obtained results. Such a possibility could occur but it would leads us, nevertheless, to the referred constraints of the position of the spectator / explorer regarding the interactive work of art (he would remain dependent of an *a priori* set rules and determinations that would be coded in this intermediary entity).

Finally, there is a third proto-solution for the apory, that focuses in exceptional cases, which in their turn instigate new apories and constraints regarding the definition of the comprehensive framing of the analyzed dialectic trinomial. These cases are related to research developments in the areas of cognitive science, neurology and artificial life. Connectionism implies, if understood as the expression of **autonomy** in computer art, the possibility of creating intelligent digital works, i.e, entities who "share" human cognitive and perceptual characteristics [17]. These new approaches reformulate the framework of artistic interaction possibilities, and, thence, the status of interactivity. Based in neural and genetic algorithms, the connectionism research conveys possibilities of creating programs that make decisions, actions that were not pre-programmed. Couchot exposed the example of the work: *Dance Avec Moi*, 2001 (COUCHOT, HILLAIRE 2003) to demonstrate the learning ability and adequacy of such a program in relation to indeterminate human interactions.

Therefore, predicting the distant reality revealed by this proto-solution, its advent constitutes yet another

apory that deals with the position of indeterminacy of the formal scheme of artistic interactivity. Although, in the latter case, the interaction can indeed occur *impromptu*, between the computer program and the spectator, nevertheless, in this situation the artist assumes the role of **quasi-Demiurge**, for he creates a work that holds his encrypted chosen rules, even if they imitate neuronal and genetic processes and consequently represent possibilities of detaining: memory, autonomous decision, action, as well the capacity to learn from a mistake; this work can, in short, create and deliberately act. What will happen in this case is that the teleologic intentionality remains functional in the outlined phenomenologic framework, as the choice to create a work of art of having a particular algorithm in its composition is the responsibility of the artist, for it's fixed *a priori* (this constitutes a deliberation about which nothing can be done by the spectator other than submit to it). But this intentionality limits itself to a decision that triggers a chain of events which, considering the nature of the algorithms in question, transcends the artist's creative purposes, standing the work of art in a similar plan to human autonomy / free will, if we compare the origins of man, present in the exegetical texts, as a creature of God [18]. So, and because it ignores, even if partially, the teleologic intentionality of the artist, this relatively autonomous work is worthy of the designation "creature" or entity. The status of the spectator, within the abovementioned dialectic trinomial, also slightly changes within this new proto-solution framework, for the exploratory behavior of the work of art will translate into an ontological interactive agency, because the action and involvement with the work of art may trigger responses and results that could not be found in the limits of the formal programmed code, which in turn regulates all the envisaged potential / virtual activities pre-figured in the limits of the functionalities of the work of art.

## VI. CONCLUSION

Couchot and Hillaire state, as a possibility of explanation of the status of interactivity in the production of works of art via computer systems with interactive devices, that one can contemplate two main elements in this process: there are two co-authors of the work of art, which, however, occupy different spaces and positions within the creative process, although they share a common purpose, namely, that of artistic creation. In their perspective, we have, firstly, the author (the artist), that is responsible for the design of the project, who takes the initiative to encrypt the thread of events that will constitute the limits of potential interactions regulating the

conditions under which the spectator will participate in developing the work of art, allowing a certain coefficient of exploratory, but conditional or partial freedom. At the other pole of the artistic interactivity we find the other author: the spectator, who is responsible for actualizing the potentialities of the work (COUCHOT, HILLAIRE 2003). This proposal seems to be reconciling, but it fails to consider the issue of free causality as a fundamental concept of creation, and therefore, although it seems like an interesting attempt to examine the problem, we maintain our argument position, stating that, apparently, the referred apory is far from resolved.

The future of interactive art may involve the actual design of a truly hybridization of humans and machines / programs, being it strictly at the level of interaction, or at the level of development of a *grotesque proto-human species* [19]. Erin Manning presents an interesting conceptual approach regarding the referred interactivity constraints, which partly validates abovementioned argumentation, considering particularly the problem of multimodal complex artistic **hyper-representation** of movement, through computing systems with prosthetics devices (eg: bodysuit interfaces), as she states that only a **technogenetic body** will be capable of mapping / translating the micro-gestures and potential intentionalities that are present in the phenomenon of movement (the continuum), because computing systems with prosthetic devices fail to properly represent, for instance, the **preacceleration** (MANNING 2009) [20].

Interactivity is generally considered, in terms of definition, as the result of a co-causal action that derives in a certain artistic product. It's assumed that this artistic work is co-created by both artist and spectator, the interactions being the coefficient of the spectator's participation with the work.

The interactive work of art is characterized by a certain mode of indeterminacy, for it's not a finalized work of art but a potential work of art that should be actualized by the spectator.

We understand the main arguments of the exposed theoretical compounds, and we don't deny the theories of a **proactivity of the artistic reception**, but to consider as co-created an artistic product about which we have nothing more than the possibility of "entertaining" ourselves in actualizing its potentialities, seems a conceptual misguidance that we should avoid. We'd rather intend to follow the paths of inquiry, trying to grasp the ongoing subtle and intertwined contingencies that are patent in this complex and fascinating thematic.

## ENDNOTES:

[1] **Apory** derives from the Greek word **aporia** and relates to the ideas of impasse, confusion or structural doubt. This term is part of the dialogic Socratic philosophy that is stated in several of Plato's dialogues. Its signification implies a problem that causes perplexity due to the apparently insoluble questions it presents. Etymologically, the term *apory* is constituted by the morphemes *a* and *poros*, meaning literally: without and passage, portraying the idea of finding a sort of dead end, a state of perplexity and fierce indecision. In order to understand the term one should analyze the significance of the word *aporetic*. Aporetic's connotative ideas point to an existential situation of *being at loss*, to find an impassable trail. The term is used in this paper not in the philosophical sense of considering two opposed premises that represent possible plausible but inconsistent solutions for a problem or question, but on the strong sense of an extreme theoretical difficulty or impasse regarding the solution of a problem.

[2] We mainly refer to works like audiovisual interactive installations and / or performances which imply the live participation / interaction of the spectator with the work of art. These works must be closed, i.e, finalized in terms of programming.

[3] **Techné**, stands for the Greek term that derived from the word technique. This term was used during the ancient Greek civilization to define the concept of art.

[4] PIMENTA, Emanuel D. M., "John Cage - The Music of Silence," SilvanaEditoriale, Milano, 2003, pg. 30.

[5] We only mentioned these three aesthetic movements due to the need for a synthesis and because they are not, by themselves, objects of reflection to the study of our theme, but rather milestones in the formal historical contextualization framework that we intend to undertake.

[6] The ambiguity is, in the negative sense, figured as an artistic production methodology, for it is stated as an imperative need to escape the linear or literal sense of the creative process (for example of the poetic, literary, musical or cinematic narratives). This negative sense reveals the absence of a guiding center that postulates a univocal hermeneutics (in other words, a closed and linear interpretation). The positive sense of ambiguity constitutes the mechanism that allows new configurations of the work at each new aesthetic enjoyment.



[7] Groupe de Recherche d'Art Visual (Group of Visual Art Research), was constituted by a handful of artists (Le Parc, Julio, Morellet, Francois Sobrino, Francisco Stein, Joel Yvaral, Jean-Pierre) whom shared the core goal to create an anonym or transpersonal art. The participation of the spectator in the creation of the work of art turned, in this sense and for these artists, into an objective formal implication of essential value.

[8] This total participation idea was responsible, among other significant posterior theoretical developments, for the creation of new concepts as spect-actor and interactor. Although these concepts are pertinent in the area of interactive performance / art, they aren't ignored by the author in the present instance, but were not focused on simply because they imply several other issues that are not in analysis in the present paper. We prefer to use the terms spectator and explorer.

[9] The Copernican Revolution consists on the re-centering of the subject within the epistemologic process, being considered as the active element that produces reality (through his perceptive / cognoscent apparatus). Therefore, to examine the limits of the reason, implies to determine what transcendental elements, that is, *a priori* elements, constitute its operative structure and to grasp how they interrelate with each other on the advent of distinct and complementary functions with which they operate. The knowledge that is at stake is the transcendental knowledge, which is pure, as Kant puts it: "***I call transcendental all knowledge which generally occupies itself less with the objects, than with the way that allows us to know them, in such a manner that it must be possible a priori.***" (in: KANT, Immanuel, "Crítica da Razão Pura", page. 61).

[10] Such software is useful, for example, to the ideation and realization of artistic audio or video installations, live audiovisual performances, sound art performances and electroacoustic music with live electronics.

[11] The logic value is truth-functional, that is, it's a function that implies a plot of determined events as truthful, even if they are virtually truthful (or potential).

[12] One intentionality modality exists as an *a priori* expression (the teleologic) and the other *a posteriori* expression (the noetic), although they are interdependent in a dialectic relation.

[13] We present a coherent argument to clarify any misunderstandings about the possible interpretation of the redundancy of the term, that in itself already implies a strong sense of purpose (teleologic). The reason for the explanation of the term is that the purpose of this type of intentional alienation corresponds, on the one hand, to the affirmation of the artist as producer of the work of art's limits, and secondly it corresponds to the total alienation of its the actualizing movement (realized by the spectator). Being a complex idea, this analysis splits in a two-headed dialectic conceptual formulation: teleologic intentionality and noetic intentionality.

[14] The concept of noetic (referring to the act of *noesis*) indicates the reflective capacity to understand a given idea, making it a content of thought. We use this concept to determine the idea of intentional and rational interpretation of the spectator, as being correspondent to his participation in an interactive work of art. This noetic interpretation unfolds into *a posteriori* meaning (after the artist's encoding), and this meaning is submitted to the peculiar intention that gravitates around the spectator's subjective contingencies, which are personal and utterly intransmissible.

[15] Referring to the noetic intentionality, one can also discern conceptual similarities that coincide with the aesthetic and visionary positioning of Duchamp when he states that the work of art results in the existing difference of the distance between the primary intention of the artist and what in fact is unintentionally realized, that is, the work of art as being embodied and polarized by the irrational depths of the unconscious. The noetic intentionality has, in our view, a similar formal role, excluding when we consider the justification that configures the factual realization of the work (in Duchamp's view, the creative power derives from the unconscious, we do not care for this sort of argument, for it is not an object of our study). The noetic intentionality presents itself as the construction of the spectator's hermeneutical perspective, which is constituted as he explores and interacts with the work, being for this reason *a posteriori*, corresponding to the spectator's need for interpretation, i.e., to the creation of meaning (of aesthetic reception).

[16] We equate, however, the hypothesis of the interaction being carried with specific indications by the artist, a situation that will result in a relative *a priori* knowledge of how the work can be experienced. But even if one considers this case, the main issue remains unresolved, inasmuch the aporetic impossibility of application of rules and laws that

determine the situation of parity between the artist and spectator positions, in terms of artistic creation / creative process.

[17] Features that result in a sort of *trial and error* learning situation, enabling unprecedented resolution, decision and action.

[18] What is at stake here defines a formal analogy with the position of God in relation to the Human Being: Creator and Creature. Hence, any extrapolation beyond this comparative purpose will be fallible and misses our argumentation.

[19] This statement points to the binomial Man-Machine, as it postulates the possibility of man “merging” with computer and technological elements. This event could configure a totally different way of producing art, otherworldly art we could stress, if we compare it with our current evolutionary scenario, giving rise, thus, to new apories and aesthetic theories about which we fail to present any kind of argumentation.

[20] *Preacceleration* is a concept that implies a complex relation between the complex root of movement and its actualization. For further reading analyse Manning's: “Relationscapes – Movement, Art, Philosophy” (MIT Press – Technologies of Lived Abstraction, U.S.A., 2009).

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João Castro Pinto started his creative activity as a sound and intermedia artist in the mid nineties. His artistic output includes the fields of sound art, experimental electroacoustic music and intermedia research in a transdisciplinary confrontation perspective of the digital media. He has presented his work extensively, in Portugal and abroad, in more than 100 performances, having played in prestigious institutions, collaborated with renowned artists and won a few awards and distinctions. He holds a degree in Philosophy from the U.N.L.-F.C.S.H. and currently is a PhD student and researcher in Science and Technology of the Arts at UCP - C.I.T.A.R.. More info @ <http://www.agnosia.me>