

# Corporeal interval: sensory indeterminacy as the poetic bloom of interactive art

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**Abstract.** The interactivity adds a new sensory level in art. The implementation of artificial sensory systems can enhance what was discussed earlier as a human nature, indeterminacy. In this paper, we will discuss how the indeterminacy inherent in each one of the constituent elements of aesthetic experience is an essential factor in the development of the poetics of interactive art. To this end, the thoughts of Henri Bergson on the indeterminacy of the body are related to the machine's margin of indeterminacy discussed by Gilbert Simondon. This discussion is related to a theoretical and practical research which also includes artistic production. Therefore, the reflection influences the conceptualization of Em3 interactive installation that will help in understanding the ideas developed throughout the text. Finally, the indeterminacy of artist, artwork and observer will delineate individually and collectively the concept of 'Corporeal Interval'.

## 1 Introduction

When thinking about interactive art as a new degree of openness of the artwork that follows participatory art, we find a new configuration of sensory in art emerges. In participatory art, the novelty was the possibility of the public to engage physically with the artworks, with a greater use of their bodies. Yet, in interactive art, the implementation of artificial sensor pickup systems can enhance what was discussed earlier as a natural human characteristic: indeterminacy. Aiming at embodying information technology in art, it is necessary to consider the potential contribution of these media having artistic experience as the main goal. In this paper, we will discuss how the indeterminacy inherent to each of the constituent elements of the proposed aesthetic experience is essential in the development of the poetics of interactive art. To this end, the thoughts of Henri Bergson on the indeterminacy of the body are related to the machine's margin of indeterminacy discussed by Gilbert Simondon, with a little help of the black box philosophy by Vilém Flusser and the idea of the

body as living media by Hans Belting. This discussion is related to a theoretical and practical research which also includes artistic production. Therefore, the reflection influences the conceptualization of Em3 interactive installation that will help in understanding the ideas developed throughout the text. Finally, the indeterminacy of the observer along with artwork and artist will determine, individually and collectively, the 'Corporeal Interval'.

## 2 Body and indeterminacy

The participatory art is a milestone in increasing the value of the observer's body in the artistic experience. Artworks like those of Lygia Clark and Hélio Oiticica (both Brazilians) intend to raise the awareness of the public's bodily perception. The proposal is for the observer to intervene with his own body. When the public get in contact with the artwork, his/her body performs as an expressive element. Artwork and observer will then bond as an art piece. In this process, we can identify three dimensions performed by the body during the artistic experience: plasticity, reception and mediation. Henri Bergson's thought will guide us through this discussion. His theory begins from assuming that bodies are images, developing his analysis in understanding the body as field of action, which is related to the indeterminacy inherent in their perceptual abilities.

"Consider the system of images which is called the material world. My body is one of them. Around this image is grouped the representation, i.e. its eventual influence on the others. Within it occurs affection, i.e. its actual effort upon itself. Such is indeed the fundamental difference which every one of us naturally makes between an image and a sensation." [1a]

It is worth emphasizing that the philosopher assumes that the presence of this body is itself an image, in which the other images may also create representations upon it. Therefore, from an aesthetic point of view, the body itself, may it be the artist's or the public's body, is a medium, an aesthetic element that inserts itself in the artistic experience together with the artwork, whichever type it may be. Hans Belting will also emphasize this imagery character of the body:

"Their activity is needed in order to practice visual media in the first place. (...) Bodies perform images (of themselves or even against themselves) as much as they perceive outside images. In this double sense, they are a living media that transcend the capacities of their prosthetic media " [2]

That is, before being an observer, every body is an image. The first aspect of the body to be considered in the artistic experience is its plasticity. This plasticity is the image formation process based on sighting of shapes. Every body, whether in the moment of art creation or of reception constitutes an aesthetic object as much as the artwork itself. Belting proceeds stating that the body is an image that is able to perceive external images. Each body as a 'living media', needs to sense the other images in order to interact with them. The perception process results in assimilated information. For Bergson, perception is "unlimited *de jure*" and therefore the body is characterized as a center of indeterminacy. The management of the immense field of involuntary

perception will be crucial in establishing the artistic experience for both the artist and the public.

Only after absorbing his surroundings is the individual able to develop his own aesthetic experience. After the assimilation of information, the observer can connect to the images and perform his/her action, becoming a subject in the experience. So, along with the plasticity and reception capacity, the third role performed by the body in artistic experience is the mediation: the ability to respond to his environment after assimilating perception.

In participatory art, the intersection of the potentials of action and indeterminacy will be crucial for the establishment of the artistic experience. But wouldn't the transformation of these powers in actions be subjected to the process of limitation of the perceptual field and of the capacity of assimilating the surroundings poetically? The conscious form of perception is key to the artistic experience, because without this awareness, the body-image relationship would be limited to action-and-reaction. So the indeterminacy of the body plays a vital role in participatory art.

"The degree of independence of which a living being is master, or, as we shall say, the zone of indetermination which surrounds its activity, allows, then, of an a priori estimate of the number and the distance of the things with which it is in relation. Whatever this relation may be, whatever be the inner nature of perception, we can affirm that its amplitude gives the exact measure of the indetermination of the act which is to follow." [1b]

The indetermination influences the three aspects of the body during the artistic experience. These three aspects are plasticity, reception and mediation. In participatory art, this natural indeterminacy in reception is expected to present itself in the mediation done by each individual and his or her body so that the proposal of integrating the artwork plastically is fulfilled. The same applies to interactive art, which will take the sensory topic to an artificial level. In the next section, we will reflect on how digital media may also imply a level of indeterminacy.

### **3 Machine and indeterminacy**

The use of digital media is one of the characteristics of interactive art that allows a constant update of the work in accordance with the interactor's attitude. Digital media is based on a computing machine capable of storing and processing data. Its peculiarity is the normalization of all content on numeric values, the binary code. Peripherals are attached to the computers to be used as interaction detectors or sensors and the most common are the keyboard and the mouse. In addition, you need software, such as operating system and programs to perform specific functions. We can digitize various types of analog data with it, or even convert digital data in different types. This is why Manovich [3] calls the computer "the metamedia" because it covers a variety of existing media and it also can be used as a tool for developing new media. Therefore, the digital media brings two contributions to art creation: the possibility of scanning data from various analog sensors; and the ability to instantly convert these signals into multiple expressive forms through the programming of machines and data remapping.

If the specificity of digital media is its ability to mimic between visual, audible and textual forms through time, would it have the power to trigger bodily perception in new creative levels? If we are now facing a digital media with this transformation potential, can we transform our self-perception along with them? With this question in mind, we attend to the influence of media on our perception and expression, not forgetting to link this transformation to the fact that we are interacting with machines that includes an artificial sensory system.

The possibility of going beyond human perception, allowing access to sensitivity unknown to us contributes to the interest in artificial sensors. For example, a camera with infrared light, simulates the sense of sight, but is sensitive to a type of light that our eyes are unable to see. The sensitivity of the machines and men operate from different principles. The understanding of sensitive measures by numerical values is not part of human nature. We are unable to see the machine's "feeling" process, we can only interpret its data.

Vilém Flusser attended to what escapes from human intent in the machine coding process. He developed the philosophy of the black box, known as philosophy of photography. His theory shows his insight into the man-machine relationship, in which he identified a condition of eternal untapped potential. "This is because the "machine-operator" complex is too complicated to be penetrated: it is a black box and what you see is only input and output. When you see the input and output, you see the channel encoder and not the process that goes on inside the black box." [4] Would the black box's inside content be a kind of sensitivity? Would the encoding process result from the machine's perceptual and expressive abilities? The encode process involves the artist's intention, but can he master the machine completely?

For Flusser, creative freedom is presented as a challenge to the machine users. The distinction between the intention and the result of the creative act questions its feeling when this one is brought under the understanding of the internal process of the machine. The artist who chooses to use digital media is subjected to at least two layers of this black box: the sensitiveness of the machine, and software previously installed in the machine, ie the middleware necessary to access the sensor data. Therefore, the artist is charged with the challenge of art and technology creation: to uncover emerging poetic process inherent of machine's complexity.

Gilbert Simondon studied the machine's evolution. He found in the internal development of machines, a process that he called individuation. The term 'individuation' had been used in the context of psychoanalysis by Carl Jung. In this circumstance the term is used to describe the process of acquiring personal awareness of individuality. For Jung, the individuation is primarily related to the rupture of identification with others, when a differentiation of their environment emerges. It is based on the search for a balance and adaptation of the human being to the conditions inside and outside the situation where he/she is.

The Simondon's individuation theory began discussing about the acquisition of autonomy by machines. To this end, the machine would have to acquire a certain "technicality" by achieving a concrete technical object status. This process consists of an increase in the synergy between the internal processes of the machine. To accomplish that, the machine should have a greater internal coherence, but also an opening the outer world, so that the machine can relate to its environment. In this way, technicality also opens the machine to human intervention, allowing a

relationship between them, not in the sense of dependence, but cooperation. The technical objects, little by little, lose their essential artificiality, gaining increasingly similarities with living beings. However, technical objects would never be fully concrete, but point out to the complexity that allows unexpected and non programmable reactions.

"The real perfecting of machines, which we can say raises the level of technicality, has nothing to do with an increase in automatism but, on the contrary, relates to the fact that the functioning of the machine conceals a certain margin of indetermination. It is such a margin that allows for the machine's sensitivity to outside information. (...) A purely automatic machine completely closed in on itself in a predetermined operation could only give summary results. The machine with superior technicality is an open machine, and the ensemble of open machines assumes man as permanent organizer and as a living interpreter of the inter-relationships of machines." [5]

The machine's autonomy prescribes two factors: a margin of indeterminacy and man as an interpreter of these machines. We can say that Simondon believes that the potential contribution of the machines are in their artificial sensitivity and in its relationship and communication with man. Thus, we can also relate Simondon's and Jung's individuation theory. For both of them, the process of individuation is the result of the individual being (biological or artificial) on its context. It is worthy to note that the process of individuation, for both Simondon and Jung, unveils the possibility of balance in the relationship with the otherness.

We can then return to the question about freedom brought by Flusser, still dealing with the man-machine relationship, but now from the machine point of view. The individuation process is never completely done, ie, the machine never becomes completely autonomous or the black box can never be completely unraveled. This condition prevents human to predict all its multiplicities and effectively understand their internal processes. That is how interaction is formed in art: the artwork needs the interactor in a way that it never is completely autonomous, but never quite revealing.

Could we link the darkness of the box with the machine's indeterminacy? From the human lack of comprehension, the machine's margin of indeterminacy and the game with the apparatus, we can catch a glimpse of what should be a sensitive artwork. This artwork consists of an artistic approach of the machine, that even though "works" according to the artist's code, shows itself, for both artist-programmer and interactor, as a mysterious black box. The machine is no longer treated as an obedient tool, but performs an aesthetic challenge. It is considered as a sensitive device in its perception abilities. In order to deal with an artwork that has unknown sensitivity, we need to reflect on the artwork point-of-view and its contribution to interactive art.

In this case, the artwork, as well as the artist and interactor, also performs the three dimensions of the body discussed in the first topic - reception, mediation and plasticity. If the artwork has a sensory system, the artistic experience also depends on its skills in these three areas? Obviously we do not intend to outline it as body similar to the human, but the inclusion of this new sensory system in the arts requires a closer look at their peculiarities.

In the case of analog signals, the data digitization can include an adjustment of information in the sensitivity of the sensors and in the processing of raw data yet before it becomes accessible to the machine user. This form of adjustment, in most of the time, is determined by the original function to which the machine was developed.

In the analog context, the rejected data are called noise. The noise is seen as an obstacle to the information transmission, it's an unwanted information inherent to the received signal. For Simondon, there must be a balance that sustains the yield of information for the transmission of the message, but is also necessary to keep some background noise to guaranty some energetic information outwork. According to him, the sharp reduction of the noise level affect the process of machine individuation.

“The information is distinguished from noise because you can assign a certain code to it, a regularity concerning the information. In all cases in which noise can not be reduced directly below a certain level, it operates a reduction in the margin of indeterminacy and unpredictability of information signals.” [6]

If interactive art searches this openness to the unpredictable, reducing its margin of indeterminacy would be detrimental to the machine's contribution in the establishment of the artistic experience. The openness balance in the margin of indeterminacy machine is not something quite clear. The artist may be tempted to decrease the indeterminacy, looking for a more stable and intuitive experience for the interactor. For this reason, it is up to the artist to define the measure of the proposal openness to the machine. A balance must be found between the development of a coherent system that is executable and "runs", but still provokes the public perception and allows the machine to surprise the interactor. There is a delineation of the interactor's expected behavior in an interactive artwork, which has always a variable latency from each individual. But the artist also presumes a certain behavior for the code execution in the artwork, which may incur in unplanned reactions as well.

Interactive art, besides being characterized by the dynamics of its relationships, should have its openness towards the expressiveness of the machine. The use of machinery in the artistic sphere can incorporate some functional deviations and the unforeseen dialogue between human and machine. As much confident as the artist is of the artistic and technical aspects of his/her artwork, it is in maintaining the margin of indeterminacy that the he/she may have a real openness to the unexpected. So if the unpredictability is a characteristic of the work of art open to interaction, would the artificial sensory system be a possible contributor to the artistic experience?

#### **4 Corporeal Interval in Em3**

Throughout the paper we could see how the indeterminacy is inherent to the three points of the interactive art. Artist, artwork and interactor bring along their individual indeterminacy. However, it is due to the flexible boundaries in the relational space that indeterminacy can emerge in the plural sense as the poetic bloom of interactive art. When we state that the artist should be open to the indeterminacy of the machine, we believe that by doing so, the public is inserted into the expectations game that consists interactive art. The artist creation is merely an intention, a proposal that is submitted to the indeterminacy of the artificial sensory system and the public's reactions. The public, on the other hand, also try to anticipate the artwork behavior and it is up to him to unravel and explore its possibilities by developing his/her perception. Until now, the indeterminacy has been discussed in the context of each of the individual constituents of the artistic experience, from now on, we will discuss its

collective and relational aspects, that emerges as an interval resulting from the tension between the indeterminacy degrees of the artist, the public, and the artwork.

"The visual arts refers to the concept of 'interval', which is not the 'emptiness' of west culture, but space. This is the 'in-between space' (...) what matters is the space between objects and not the objects. (...) It is the interval that allows the reading of the heterogeneous (the other) and not the homogeneous (the same)." [7]

The notion of interval arises as a consequence of this indeterminacy as a condition for art. The interactive art will be characterized as an interval for its unstable relational nature. The artistic experience occurs in the juxtaposition between the intention of the artist-programmer, the machine's margin of indeterminacy and the range of (un)expected actions in the dialogue between artist, artwork and public. The artistic proposals that open themselves to the indeterminacy of the three components, appropriate the corporeal interval its greater magnitude.

For better understanding, we will illustrate this from our own creation. Em3 is an interactive installation in which the public can contact the artist's body through the mediation of the artwork. This installation is the final experiment of a theoretical and practice research conducted over two years, that investigated the relationship of bodies mediated by sensors. On the occasion, the Microsoft Kinect 3D camera was used as a sensor due to its human movement recognition algorithm. The body data obtained through the Simple OpenNI library in the Processing programming software consists of vectors with positioning and orientation of specific points of the body, such as head, hands, shoulders, knees, etc., but also a confidence level for each one of them, which we understood as the indeterminacy margin. The installation confronts artist's and interactor's bodies as these scanned data in two projections. The first one presents graphics (lines, circles, squares), generated from the relationship of the two bodies interpreted into shapes and are back projected on an one-way-mirror, so that the interactor can see them along with his/her reflection. The second one is the silhouette of the previously recorded artist's body, which also reflects in the mirror.

The graphics are updated from various parameters into dynamic visualizations styles. The main point is based on the comparing of artist's and interactor's bodies. In order to develop the artwork, a choreography was created and recorded out of poses and movements that the sensor response was different from what we would expect. The similarity or difference between these two bodies would trigger the two main visualization modes. If the installation consider the bodies in similar poses, their skeletons representations would appear, otherwise, we could see their joints moving in space, morphing into a mass as a unshaped collective body. The two bodies are also linked with white lines if they stay close to each other, that is, if the interactor's physical body and the installation's virtual body would occupy the same space. Furthermore, the confidence level of each joint influences on its representation. The bigger the margin of indeterminacy, the greater the occupied area by this point.

The provocation is in the kind of movement made in the artist's choreography. Some of the movements were made in a way that the sensor would not recognize, so that the machine can show new perceptions of our body. Therefore, even if the interactor tried to copy the virtual body, the comparison will not be stable, because the virtual body is not a copy of the human body as the interactor is used to. In fact, the virtual body is subordinated to the perception of artificial sensory system. Thus, the bodies joints are

combined precisely because of its heterogeneity, emphasizing the difference of motion of the physical bodies, but also of human and machinic perception.

So in Em3, the dynamics of the relationships established reinforces the interval as a condition to understand the proposal and establish communication between the artwork and the public. The interval is presented as a space-time potential for transforming body paradigms. Starting from the indeterminacy as a principle, the corporeal interval is revealed in interactive art as a potential field of action and relationship. The various dimensions of the interval are embodied in the relationship between artist, work and public, whether as the distance between two points, a temporal break or a silence. In a poetic approach, the interval is more than a way to match and differentiate two bodies. It is a space of tension and exchange between artist, public and machine.

## Conclusion

By reinforcing this perceptual distinction between interactor and sensitivity of the artwork, we believe that we are increasing the space for dialogue with the machine as an expressive element of the artwork. The combination between artist's, public's and artwork's bodies occurs through different dimensions of space-time into a corporeal interval experience. This experience depends on the way each body engage in transforming the other one, in how he/she/it can amplify their own perception and relationship with the other bodies. As we see this artificial sensory system as an opportunity to make the artwork sensitive, we are embodying the artwork to the corporeal interval and we are considering its sensory system as another agent of the artistic experience.

In fact, it is the artificial sensory system that can provoke new insights of the human body through their simulacrums, promoting the exchange between artist and observer, and positioning itself in between them, as a sensitive artwork mediator. By focusing the points of distinction of this sensitivity to our own, we are embracing the unpredictable and opening ourselves to the contribution of technology to new insights of artistic perception and expression. Therefore, the corporeal interval is outlined by the machine specificity and by its embodiment into the poetic relational space of interactive art.

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