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Artstation (aka Glenn Davidson and Anne E. Hayes)
"On Conversation"

1. Summary

This essay seeks to explore a particular media art genre called "cybernetic art", more specifically, the one that takes into account some aspects of *new cybernetics* (second-order cybernetics) and includes the observer in the feedback structure, that is, prioritizes subjectivity and interpersonal factors. After analyzing that form of expression — which is not only about pressing buttons and activating sensors —, this essay puts forward a reflection on a peculiar work of Artstation, the Wales-based duo formed by Glenn Davidson and Anne E. Hayes. Underlying the commentaries about an artwork that could be labeled "second-order cybernetic art" (hereafter referred to as SOCA), some aspects of Gordon Pask's ideas will be discussed, notably excerpts from his *Conversation Theory*. The essay concludes that this form of media art genre is not a form of entertainment, but a process to improve thinking about *thinking* and, above all, a way to demonstrate that media and technology are only means to a communicative end.

2. Cybernetics — a mere historical curiosity?

The history of cybernetics is well known, but ironically this *Scienzia Nuova*[1] has almost sunk into oblivion. What started out as a new technology for predicting ballistic missile trajectories and later migrated into cognitive sciences, encroaching into the field of human conversation, ended up becoming a mere historical curiosity several decades after its

[1] See Karl H. Müller, *The BCL – an Unfinished Revolution of an Unfinished Revolution* (An Unfinished Revolution? Heinz von Foerster and the Biological Computer Laboratory 1958-1976. Albert Müller and Karl H. Müller [eds.]. Edition Echoraum, 2007) p.410

birth. This essay does not aim to revisit a confused part of the history of techno-scientific development, among other reasons because the history of cybernetics itself is ambiguous and controversial. For example, some of its detractors usually make it conditional on "victorious" capitalism, mostly under the cloak of its latest expressions: liberalism and the surveillance society[2]; others confabulate about a “cybernetic hypothesis”, a somewhat paranoiac political theory in which the underlying technical aspects of the term “control” are lacking[3].

Of considerable importance are the ideas emerging after the advent of first-order cybernetics, mainly those echoed by Gordon Pask, one of the founding fathers of “second-order cybernetics” (also known as “neocybernetics”[4]). He was a British scientist and, above all, a true 20th-century polymath, who had interest in how concepts are created and in the principles governing and lending coherence to them. Beyond that, he spent a lot of brainpower on the principal medium for concepts: conversations. Of particular importance are his ideas on how new concepts are shared: apparently, in the physical sphere, it happens when the nervous systems of bio-mechanical individuals converge. In Pask's view, however, the flesh is only a predominant form of viability of a particular species, the P-individuals, which he also called "psychological systems”, as discussed further below.

3. Second-order cybernetic art

Now that some background has been presented, at least partially, let us introduce second-order cybernetic art taking as the starting point some aspects of its precedent version: first-order cybernetic art. From the outset, the relationship between this form of art and the observer is invariably interactive, not reactive, since the art object takes part in an observer-dependency process. Artworks belonging to this genre end up reformulating the very logic of artistic experience, usually associated to a passive contemplative attitude. The proactive dialogue established between the artwork and the viewer-participant, therefore, has first-order

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[2] See Brian Holmes, *Future Map* http://brianholmes.wordpress.com/2007/09/09/future-map/ (2007)
[3] See discussion about *The Cybernetic Hypothesis* in CYBCOM archives https://hermes.gwu.edu/cgi-bin/wa?A1=ind1010&L=cybcom#11 (October 2010). See eponymous article divided into eleven sections (in Tiqqun #2, 2001): https://cybernet.jottit.com/
[4] See Peter Cariani extended review of *Emergence and Embodiment: New Essays on Second-Order Systems Theory*. Edited by Bruce Clark and Mark B. N. Hanson (in Constructivist Foundations, Volume 5, Number 2, 15 March 2010) pp.86-91

aspects, i.e., both the observer and the object have predefined objectives; and causal processes acting on both sides lead to actions that yield responses that lead to new actions, and so forth.

This process is also present in a second-order cybernetic artwork which, by and large, has no essential attributes (controversial, interesting, beautiful etc.), its qualities being constructed from the scratch by the viewer-participant (Müller, 2007). To assist in this task, an applicable SOCA simulates (applying various media) how new building blocks of percepts, affects and thoughts can be brought into being, or new *primitives*, as stated by the American neuroscientist Peter Cariani. According to him, primitives can be "formal 'symbols' or 'states'; they can be functionalities or operations; they can be primitive assumptions of a theory; they can be primitive sensations and/or ideas; they can be the basic parts of an observer's model"[5]. Within the scope of this essay, the surging of new concepts is directly related to creative emergence of new primitives (Cariani, 1991).

As we mentioned earlier, SOCA establishes the very same characteristics of first-order cybernetic art, but concomitantly highlights the metaphor of conversation, a singular relationship out of which something new emerges — new concepts more accurately. It will become one of the main thesis of this essay the claim that the chosen artwork associated to this genre seeks to simulate the dynamic motion of mind by evidencing how it "occupies space" in order to exist[6]. In addition, the SOCA example researched for this essay takes a step forward in operating through the tension between representational and performative practices. Hence, we will notice that the work has two main traits: it picks up on thinking processes through virtual representations and follows up with the "externalization" of some of those processes at a public event.

3.1 Recursion, not repetition

Generally, SOCA encompases the notions of *recursivity* (an operation related to the circular relationship between two or more systems[7]) and

[5] Peter Cariani, *Emergence and Artificial Life* (Artificial Life II. Volume X, Santa Fe Institute Studies in the Science of Complexity. Edited by C. G. Langton, C. Taylor, J. D. Farmer and S. Rasmussen. Redwood City, CA: Addison-Wesley, 1992) pp.775-798

[6] Quoted from *Bitori Virginia Beach ASC*: http://www.artstation.org.uk/bitori/bitori.doc

[7] An important distinction has been suggested by Joel Isaacson in CYBCOM listserv (11 November, 2010): "Circularity is phenomenal, a perceptual event in the mind of an observer. It is usually a by-product of one of two distinct underlying mechanisms that are far less observable per se, i.e., repetition

individuation (individuals continuously becoming... *individuals*[8]). First of all, though, the question is, what is "recursivity" actually? In the context of this essay, it is a relationship that gives rise to a minimum of self-reflexivity: "I not only know, I feel that I know (that it is I who knows); I not only perceive an object, I am aware of myself perceiving it; I not only act, I feel that it is I who acts. *I do not relate to (interact with) only an object: I relate to this relating "as such"*[9]. Thus, in the first instance, recursion is behind mind workings and self-consciousness. For example, when an individual sets off recursive operations between internal differing perspectives, this function despite being egotistically self-referential forges ahead like a river, sure-footedly, analogous as

when the circular movement of the wheels of a car is coupled with the linear displacement of the ground, the circular movement of the wheels becomes recursive and the phenomenon of movement appears[10].

In the second instance, such "strange attractor"[11] tends to coalesce during execution by an *eigen function*, a mathematical process that repeats its operation recursively until converging to a stable point (or coherence). The American cyberneticist Paul Pangaro exemplifies the function as follows: "[if someone takes] the square root of any number, and then the square root of the result, and then the square root of the result of that, and so on.... the result converges on number one"[12]. Thus, any process of *individuation* depends heavily on near-coherent and coherent concepts achieved by means of recursive loops between differing perspectives inside the individual. In the social sphere, internal agreements (between P-individuals of the same -individual) must precede agreements instantiating externally (between P-individuals of different M-individuals).

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and recursion. Under repetition, a given pattern reappears intact periodically in the perception of an observer. Under recursion, a given pattern undergoes successive changes, from one stage to the next, while usually retaining some 'core' features from the initial pattern. Each change builds on the immediately prior pattern. Often, but not always, the number of all possible changes is finite, and this may bring about in the mind of an observer a perception of circularity in the successive sequence of changes."

[8] For a summarizing notion of "individuation" see Steven Shaviro, *Gilbert Simondon* (The Pinocchio Theory, 4 December 2003) http://www.shaviro.com/Blog/?p=219

[9] See Slavoj Zizek, *The Parallax View* (The MIT Press, 2006) p.225 (Zizek's italics)

[10] Humberto Maturana; Jorge Mpodozis and Juan Carlos Letelier, *Brain, language and the origin of human mental functions* (Biological Research, 28, 1995) pp.15-26

[11] See Paul Pangaro. *The Past-Future of Cybernetics: Conversations, von Foerster, and the BCL* (In An Unfinished Revolution? Heinz von Foerster and the Biological Computer Laboratory 1958-1976. Albert Müller and Karl H. Müller [eds]. Edition Echoraum, 2007) pp.162-166

[12] See Paul Pangaro, *Interaction - Emergence - Autonomy, A Journey of Meaning* [Emoção Art.ficial 5.0: Autonomia Cibernética] (Itaú Cultural, 2010) pp.29-45

3.2 Performative ontology

Aside from informing such self-referential loops, the artwork discussed in this essay stresses a "cybernetic ontology of performative interaction"[13]. It is necessary to clarify in advance that its performance aspect refers not exactly to "conversational art" and performance-based actions during 1960s and 1970s, but rather to *performative adaptation* (another statement for "learning"). Furthermore, the paper sculptures inflated by Artstation[14] are ultimately object-based artworks which — eventually — unfold on social action performances. For instance, in 2008 the artists developed a video art installation that reported the poor conditions of asylum seekers in Le Petit Chateau, Brussels. The paper sculpture built for the project — an image of the aforementioned conditions (refugees "walking on air"[15]) — served as a link between an object of art and a concrete action, for it brought up awareness and options to policy makers in Belgium.

By the same token, but not necessarily in the form of a collective happening grounded on a traditional performative rhetoric, the performance discussed in the following sections imply an engagement with a metastable environment that exists only to leave a trail or rather a hunch; it functions more as a "vanishing mediator" between a mediated individuation process (observing through virtual media internal conversation and the production of new concepts) and an action where viewer-participants experience a walk around and inside a paper sculpture, a "time-based space" on the verge of falling apart. In summary, a mediated moving from abstract to actual. It is hoped that the precarious construct leverages emancipation from certain capacities (not in a pedagogical or professorial way) by reinforcing individuals' adaptation to a new mode of sense, unassigned to social and educational conditions[16].

Probably the performance of Gordon Pask and Glenn Davidson (cf. Fig. 9) walking inside the "topological" paper sculpture did not add much value to the educational system or the art market, but the action perpetrated by master and disciple somehow evoked a learning process in which

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[13] Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future* (University Of Chicago Press, 2010) p.42

[14] For more detailed information about Artstation see: http://www.artstation.org.uk

[15] Wyn Mason (in collaboration with Glenn Davidson). *Paperwork: Filmmaking and the Cybernetic Method* (Journal of Media Practice, 2007). pp.147-160

[16] Jacques Rancière, *The Emancipated Spectator* (Verso, 2009) pp.16-17

“knowledge as an object distinct from learner-teachers does not exist; learners always incorporate internalized teachers, and teachers always incorporate internalized learners who help construct their knowledge”[17]. In a practical sense, it occurs when feedbacks (one of the stalwarts of the first-order cybernetics) are replaced by *teachbacks* (Boyd, 2004), a relationship which equalizes the “schoolmaster knowledge” and the “ignoramus’s knowledge” (Rancière, 2009). Such perspective is the essential condition for a more reliable and efficient process of knowledge and information transmission, namely, concept synchronization (or agreement through conversation — the cornerstone of Conversation Theory).

4. Beyond the communication theory

What would be a genuine SOCA specimen? Maybe the closest to such strict definitions is *On conversation*, a project composed of animations programmed in 1988 on an Atari computer in Holland and a huge paper sculpture which was built in the following year by Artstation in Virginia Beach, USA, for the American Cybernetics Society conference on "Connections". By that time, the English cybernetician and the Welsh duo had been collaborating together during their residency fellowship in the research program OOC (Ondersteuning, Overlaving, Cultuur) at University of Amsterdam, attempting to model the dynamic process of conversation (internal and external), whose results were embodied in the form of card sculptures, digital objects and paper monuments. In summary, they were determined to show that the very act of thinking is, in principle, sculptural.

[17] Gary McIntyre Boyd, *Conversation Theory* (D.D. Jonassen [ed.] Handbook of research on educational communications and technology. Second Edition [a Project of the AECT]. Mahwah, NJ: Lawrence Erlbaum Associates, 2004)

Figure 1. (Still) Gordon Pask with a physical CT model in Artstation's studio in Amsterdam, 1988
(By permission of Artstation aka Glenn Davidson and Anne E. Hayes)

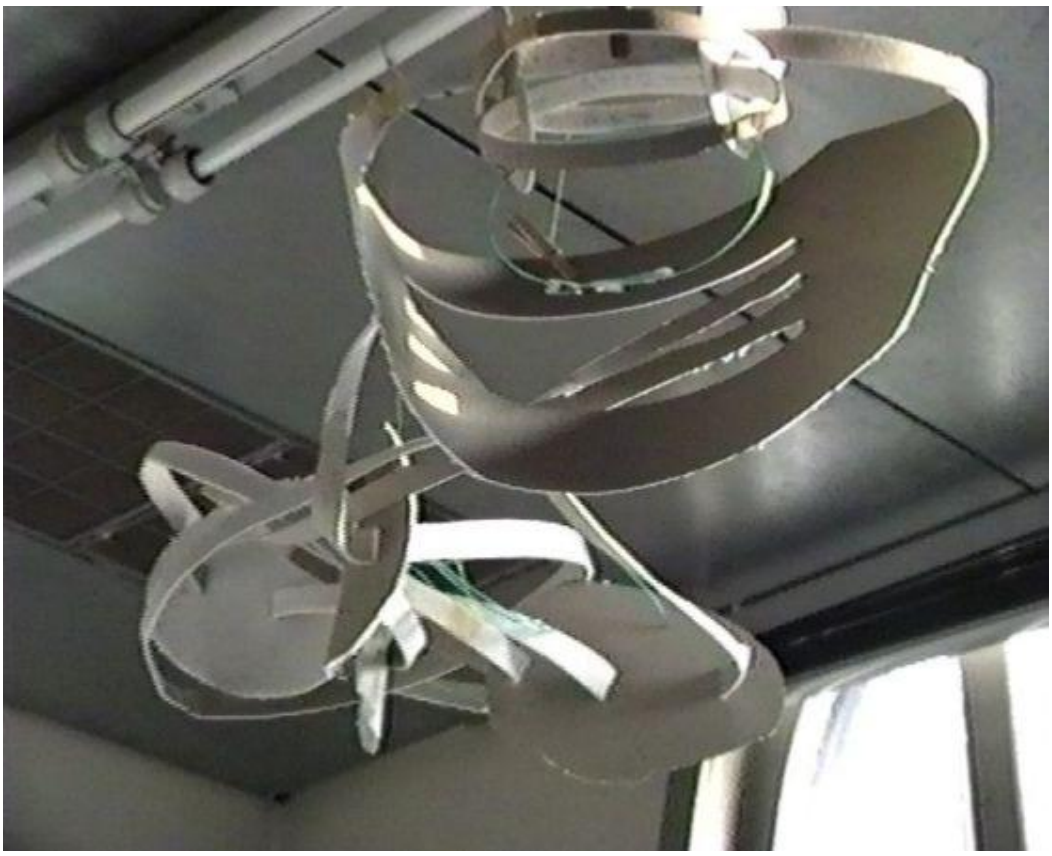

Figure 2. (Still) Another card maquette inspired by CT, 1988
(By permission of Artstation aka Glenn Davidson and Anne E. Hayes)

The artists and Gordon Pask were fascinated by the topology of conversational relations and involved themselves in the elaboration of a series of "visualization systems" in order to prototype the complex diagrams of Conversation Theory (CT), an ambitious framework regarding how mental operations functions and how learning takes place. The video recorded by Anne E. Hayes and Glenn Davidson which documents their experiments from 1988 to 1990 has been shown in *Pask Present*[18], an exhibition which took place in Vienna, in 2008. Its first part features mathematician Joachim Mowitz and Gordon Pask cutting out card maquettes (cf. Fig. 1; Fig. 2), thus revealing the immanence of the forces that govern conversations, both external and internal. Out of curiosity, a significant part of CT reflects upon *internal* conversation, but obviously it is not related to the psychotic subject guided by inner voices; self-conversations, according to CT, are the raw material that leads the brain to make a decision or produce a new concept.

The second part of the video features the CAD animations modelled and animated by Glenn Davidson on an Atari 1040St (cf. Fig. 5; Fig. 6). His proposal was to place a point of view (POV) within a virtual dynamic system, thus moving the viewer-participant towards the visualization of a *bifurcation*, a "key process within the dynamics of CT, occurring where a [conversational] process branches to create new distinctions and generating new surfaces or carapaces"[19]. Finally, the third part features the artists' monumental installation "BiTori" created especially for the ACS conference in Virginia Beach, part of a performance in which Glenn Davidson and Gordon Pask "bifurcated together"[20] inside a huge paper sculpture filled by air, which then collapsed like a house of cards (cf. Fig. 6), much to the cheer of the curious crowd. But before describing the artwork proper, it is relevant to define in advance some basic assumptions about CT, the theory whose main tenets are "communication and conversation are distinct" and "conversation is concept sharing"[21].

[18] For more detailed information about Pask Present exhibition (Curated by Richard Brown, Stephen Gage and Ranulph Glanville) see http://paskpresent.com/

[19] Glenn Davidson, Anne Hayes, Nicholas Tresilian (eds.), *Artstations Practice and a Cybernetic Canon* (19th European Meeting on Cybernetics and Systems Research University of Vienna, 25-28 March 2008)

[20] Information provided by Glenn Davidson by e-mail on 13 October 2010

[21] Gordon Pask, *The Limits of Togetherness* (Information Processing 80, S.H. Lavington (ed.) North-Holland Publishing Company, 1980)

4.1 Disembodied concepts

One of the bedrock of CT is its singular notion of concept, clearly distinguished from philosophical (*i.e.* Hegel's *Begriff*) and psychological approaches. For Gordon Pask, concepts are bundles of procedures (Boyd, 2004), similar to autonomous computer programs. Therefore, concepts have embedded in their cores executable procedures that reconstruct relations of "chains of signifier", ensuring their stabilization by memorization and subsequent propagation by means of "entailment meshes", as called by the British scientist. For instance, individual (A) constructs a concept of a circle (T) from concept plane (P) and compass (Q), and individual (B) constitutes the same concept (T) from two different concepts, say cylinder (R) and slice (S). If the two individuals reach an agreement over (T), in spite of their different standpoint topics, a shared concept is born (cf. Fig. 3; Pask, 1980).

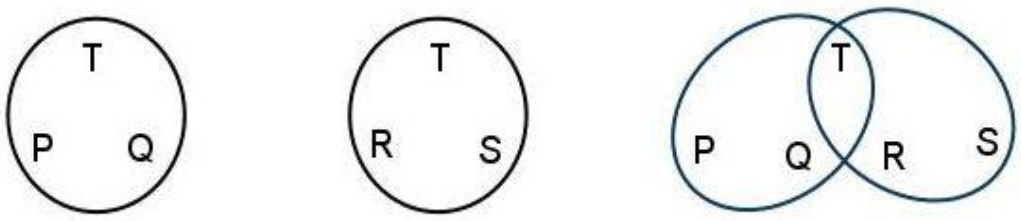

Fig.3

The rule of the minimal persisting concept triple is due respected, as shown in the intersection diagram above. Permissible but quite complex forms (Pask, 1980) may emerge during execution of procedures coming from conversational participants sharing a language and a knowledge domain (cf. Fig.4; Pask, 1980). One may notice, through these simple set drawings, that the idea of coherence (or agreement) is an essential property of concept processing, and how distinct topics operate together as interpenetrating processes that cohere by recursion. Moreover, when participants engage in conversation based upon a given repertoire, the initial agreement (or agreement on disagreement) calls for a new running of the procedure, which calls for a new batch of procedures, and so on until the reaching of a new concept.

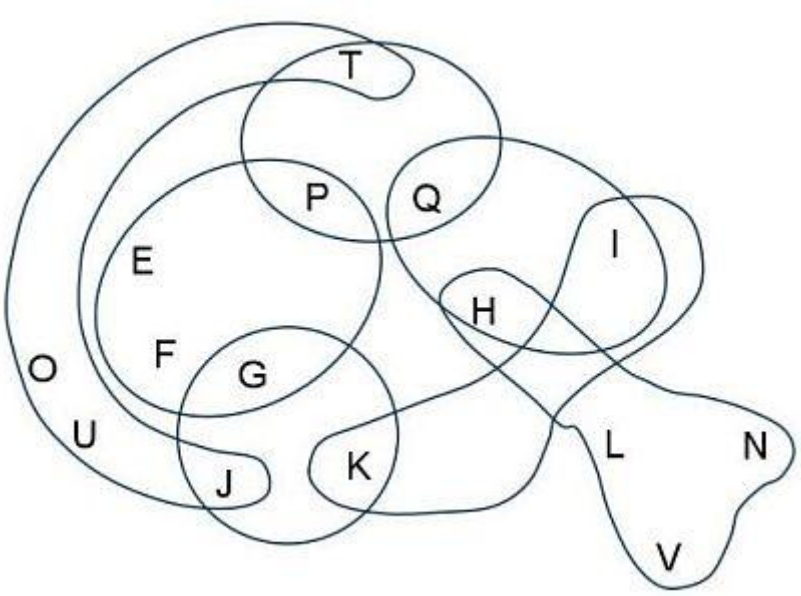

Fig.4

As the world is not exclusively populated by conversational humans, Pask has conceived a network of disembodied procedures — the P-individuals (or “psychological individuals”) — that would be “incubated” by different types of processors — the M-individuals (or “mechanical individuals”), described by him as made of flesh and bone (and of non-organic material), a trans-specific community of organic bodies and electronic/digital media functioning virtually as co-extensions of human nervous system. Therefore, stable concepts — or shared awareness — would be processed either by humans or by machines, which would permit them migrate to other "hosts" (Boyd, 2004), bumping into another P-individuals and maintaining the conservation of a collective consciousness. Provided only by his visionary gift, Pask somehow anticipated the advent of ubiquitous computing and mobile technologies.

5. Multidimensional chat

Conversations with Gordon Pask inspired Anne E. Hayes and Glenn Davidson to “port” the famous diagrams of CT drawn by the British scientist to the 3D universe. Initially, the duo used the program CAD 3D — developed in 1986/87 by Gary Yost and Tom Hudson Antic software company — to model monochromatic frameworks with a 16 bit palette color at low resolution (340x200), but then they felt the need to develop (with the help of the mathematician Joachim Mowitz) their own software — Splicer — an application capable of loading models developed in CAD 3D. This upgrade allowed a greater control of scale, adding a more robust

color palette, and finally, facilitating the plotting of the objects in the physical world. The video documentation presented in *Pask Present* features Mowitz addressing the geometrical merge of the tori, thanks to CAD 3D programming pipeline and its Basic like control language.

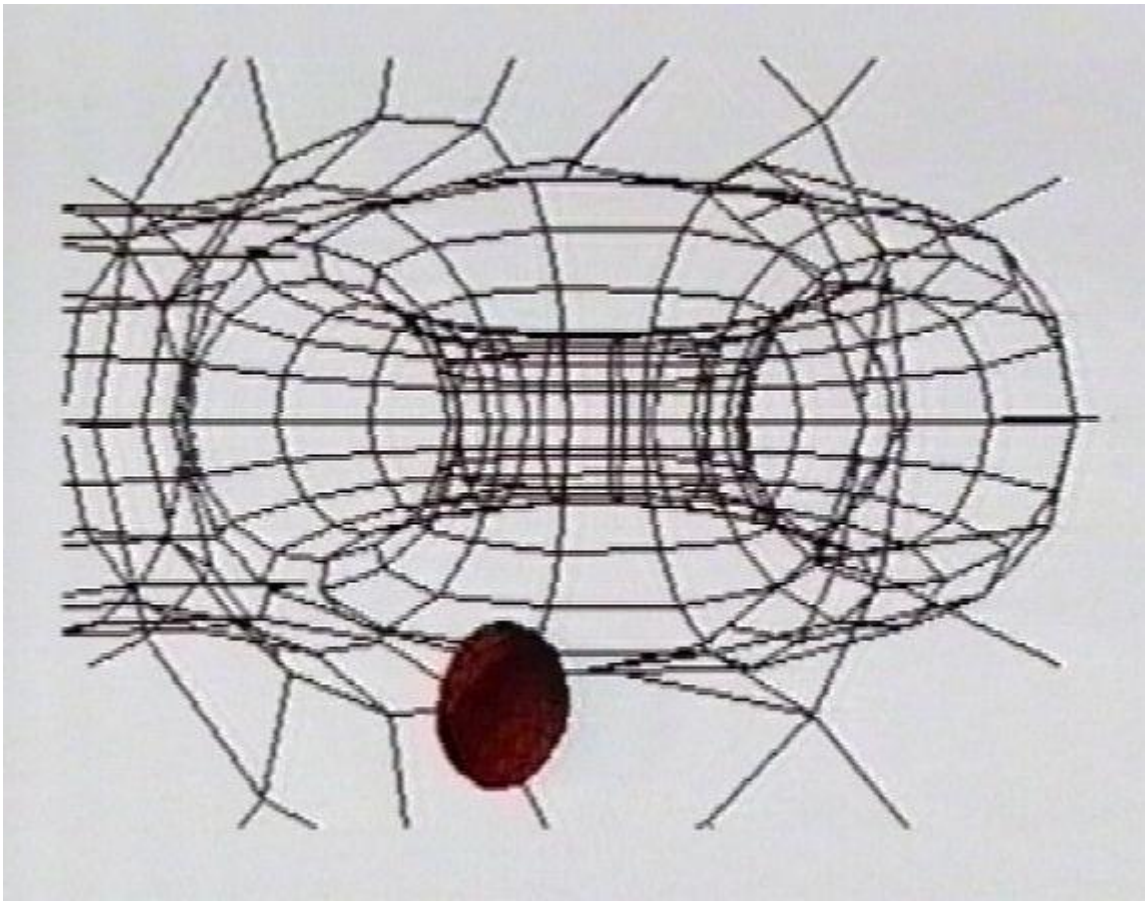

Figure 5. (Still) “Travel Through Adjoined Tori”, CT animation, CAD 3D, Atari 1040St, 1988
(By permission of Artstation aka Glenn Davidson and Anne E. Hayes)

Figure 6. (Still) "Bifurcation Into Orthogonal World", CT animation, CAD 3D, Atari 1040St, 1988
(By permission of Artstation aka Glenn Davidson and Anne E. Hayes)

The first rendering of this video segment, titled "Travel Through Adjoined Tori", features a concept in the form of a sphere made of wire-frame rolling through channels of conjoined tori, flying up into orthogonal worlds, a space comprised of serial tori (cf. Fig. 5; see Section 6). In the second one, titled "Bifurcation Into Orthogonal World", we learn that conversational worlds evolve at 90 degree angles to each other, compelling concepts in danger of breaking down to branch orthogonally (or bifurcate) into two new concepts whose structures stabilize themselves by the counteracting forces of compression and tension (or *tensegrity*[22]), not by a steady-state condition (cf. Fig. 6). As previously argued, when two individuals reach an agreement over a concept, a "co-authored novelty is shared in conjoined space expressed as an orthogonal construct."[23]

[22] For a generalization of the notion of "tensegrity," see Donald E. Ingber, *The Architecture of Life* (Scientific American, January 1998), p.48
[23] Information provided by Glenn Davidson by e-mail on 1 September 2010

In principle, 3D structures of CT are no better or worse than its representations by drawings and notations, exactly the same way the written word is no better or worse than the spoken word, which can be instances of the same referent. What matters is that "a model of the digestive system cannot digest real food" (Searle, 1969 *apud* Boyd, 2004), but "if a model can emulate some feature of the system modelled, one has learned something, if only tentatively, about the go of the latter, its inner workings." (Pickering, 2010) And yet, digital modelling of CT offers a reliable “look and feel” of the spatial dynamic of concepts moving forward through conversation. Thus, the “slick” wire-frames modelled by Artstation have almost an homologous function to that of visualization systems — in this case a visualization system of concepts and agreements on understandings, not a functional system for data statistical analyses.

6. A paperweight metonymy

Finally, the second instalment of *On conversation* is “BiTori” (cf. Fig. 7; Fig. 8). The huge paper sculpture — first modelled in CAD 3D program and then painstakingly constructed with material sold in any stationery shop, glue and industrial paper — was a structure supposedly designed to offer a “view from within” of a basic configuration of the complex tangle of knots and twists of concepts emerging from a conversation between two or more people (or even between differing perspectives inside the subject), a mental process that can be “sculptured” through the coupling of three-dimensional geometric constructions, such as a torus, a topological doughnut-shaped figure. Thus, “templates” of thoughts being dislocated by conversations can be “visualized” with at least two interconnected tori, the minimum structure required for a mind to unfold into new domains.

Figure 7. (Still) Paper installation, Virginia Beach, USA, 1989
(By permission of Artstation aka Glenn Davidson and Anne E. Hayes)

Figure 8. (Still) Paper installation falling apart, 1989
(By permission of Artstation aka Glenn Davidson and Anne E. Hayes)

Whilst the format of a torus is the result of rotating a circle around a circular three-dimensional space, the conversations of concepts evolve similarly, but in this case around a “n-dimensional cultural space” (Boyd, 2004). The metaphor is not confined only to generate a similarity between the revolution of the circles and the thought convolutions that result, for example, from an agreement between two subjects about a controversial topic; one can say that the comparison between the conversational dynamic and the geometrical figure of a doughnut is the most faithful example of the art of manipulating defensible metaphors, an expression proposed by Gordon Pask to describe the protean character of cybernetics. But perhaps there is an extension between the two elements; it is not a case of relational similarity, as in metaphor, but of contiguity, as in metonymy. Paraphrasing Pask, would the conversation and the torus not form, under this perspective, a perfect "defensible *metonymy*?"

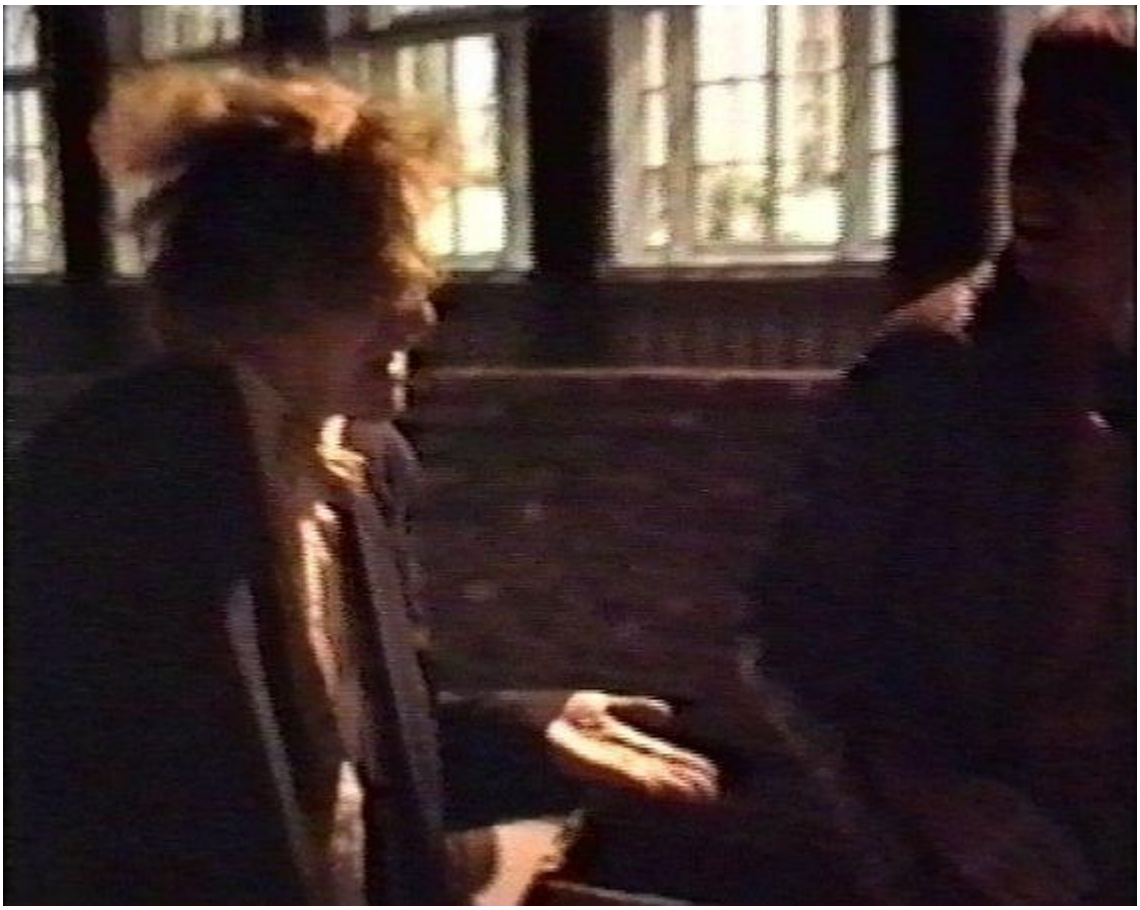

Figure 9. (Still) Gordon Pask (left) and Glenn Davidson (right) stepping out from *BiTori*, 1989
(By permission of Artstation aka Glenn Davidson and Anne E. Hayes)

When a viewer-participant enters the paper installation of *On conversation* during a performance s/he will not necessarily perceive that s/he is within a sculpture representing the intertwined relationship between two or more conversational subjects, but when having to decide which path to follow before the collapsing of the structure, s/he will be able to assimilate, intuitively, the notion of bifurcation, a conflict resolution feature that is part of CT machinery. When two participants face an understanding impasse with regard to a given concept — or when a concept becomes “glib” due to the concurrence of conceptual "intruders" — the act of bifurcation takes place (in CT terminology), a kind of corrective maintenance. For example, a participant may propose the concept of a many-sided polygon to describe a circle instead of the topics "plane" and "compass", shown in Figure 3. If the new topic stabilizes, it becomes pre-eminent in further conversations.

7. Conclusion

First, *On conversation* reinforces the notion of centred self as being the outcome of differing internal perspectives, and, conversely, through a performative action, which might be realized in a communal space, the same centred self becomes *decentred*. The artistic strategy of Artstation is to induce the viewer-participant to achieve a higher-level behavior: to perceive adaptation as a learning process, that is, to be able to realize adjustments to new mental structures (mind hacking?) and social habits (revolution?). This correlation of subjective and intersubjective forces could be metaphorically explained by the notion of *tensegrity* (a *portmanteau* that blends the words "tensional" and "integrity"), a type of physical structure whose mechanical stability is based on a tense balance between compression (illustrated by the recursive process) and traction (illustrated by the performative process).

Regarding the notion of concept, according to Glenn Davidson[24], what is referred by *On conversation* prototyping is nothing more than the end-product of thinking, a non-Cartesian form of *cogito* aimed at concept generation (self-conversation) and concept sharing (external conversation). It is very much as though concepts were spatial objects liable to rules, boundaries and behaviours. Furthermore, Artstation proposal was to evoke how independent and asynchronous individuals (in

[24] Information provided by Glenn Davidson by e-mail on 1 September 2010

process of *individuation*) become temporarily synchronous and locally dependent during the production and sharing of concepts by means of conversation (Pask 1980). This suggests that the project was designed not precisely to be an expression of “conceptual art” — in the sense of Joseph Kosuth *et caterva* artistic production — but was conceived as a work of art about the nature of concepts.

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http://www.asc-cybernetics.org/2010/

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http://www.artstation.org.uk

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Gluing a Torus
http://www.youtube.com/watch?v=0H5_h-RB0T8

The Fundamental Group of the Torus is Abelian
http://www.youtube.com/watch?v=nLcr-DWVEto

Torus Facts
http://www.mathsisfun.com/geometry/torus.html

10. Software

KnotPlot
http://www.knotplot.com