

RETRO ENGINEERING AND ALTERNATIVE HISTORIES: POSSIBLE ROADS TOWARD MEDIA ARCHAEOLOGICAL RECONSTRUCTION

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Abstract

This paper gives an insight of a research on media archaeological reconstruction of media and digital artworks. This experimental approach, illustrated by two practical cases, results in a duplication of the artworks within their original machines and languages. Based on retro engineering process, this approach is becoming a way to investigate the known, unknown and alternative stories by and for the machines. The goal being to produce archives, witnesses of the machines' related history and inherent imaginary.
Keywords: Media Archaeology - Retro Engineering - Imaginary - socio-technical history.

Oliver Grau introduces his book *Media Art Histories* by sharing with us his concern to see a “significant portion of the cultural memory of our recent history” [1] disappearing as fast as it appeared. As a media and digital art conservator-restorer and a media archaeology research student, I share his concern.

This paper precisely focuses on these disappearance issues, and not just the one of artworks: their materialities, imaginary and related knowledge are also addressed.

The reconstruction of disappeared artworks “has always been one of the most controversial issues” [2]. My research addresses an experimental approach involving producing second originals, meaning media archaeological reconstructions at the lowest level of materiality of media and digital artworks often existing only as ruins or memories. This approach, developed by the PAMAL, has the particularity to focus on the so-called “original” and what can be narrated through its reconstruction.

Addressed from the materiality point of view, the reconstruction act leads to the duplication of this “original” within its initial machines and languages. This duplication allows maintaining the artwork's accessibility under its initial form in

Fig. 1. Reconstruction of the images of *Reabracadabra* (1985), a videotext poem from Eduardo Kac, on a color Minitel. (cc-by-nc-sa 3.0 Eduardo Kac/PAMAL. Photo: Morgane Stricot.)



order to forecast long-term preservation solutions. It also allows experiencing the act of creation backwards. This is this part, focusing on the process rather than the result that would be investigated in this article through two practical cases.

Retro Engineering and Alternative Histories

In the conservation of software-based artworks, retro engineering or reverse engineering is used as a maintenance strategy in which “a system is analyzed to identify its component parts and the interrelationships among these parts for the purpose of either creating representations of the system in another form or representation at a higher level of abstraction” [3].

In my case, the retro engineering process used during the reconstruction act is a pretext to explore each very layer of the machines' operational functions determining the aesthetic or conceptual characteristics of the artwork (by opportunity or constraint) and contextualize them into a set of mainstream practices as well as alternative ones.

In the reconstruction of “archaeological” ruins, the emphasis is placed on the necessity to not yield into conjecture at the risk that the reconstruction is becoming a recreation [4]. Maybe, but the machines and their inherent obsolescence come with an imaginary: each reconstructed layer comes with alternative [5] and forgotten paths which would be prejudicial to abandon, even if it involves a highly conjectural and incomplete result. Media archaeological reconstruction is a way to narrate the known, unknown and alternative stories by and for the machines.

Minitel-based Artwork

A significant example of this experimental approach is the reconstruction [6] of Eduardo Kac's videotext poems (1985-86) network-based artworks originally exhibited online on a color Minitel [7].

The final shutdown of the French Minitel servers in 2012 led to the total vanishing of Minitel Art. The machines are still widely available on second-hand markets, but without the network, they are inert, useless data transmitters.

With the help of Eduardo Kac and several slides of the animated colorful videotext poems, a retro engineering process was initiated to restore the experience of these animations on their original machine. Progressing layer by layer while studying the whole system from its interface to the hexadecimal-based language, the reconstruction of the images and their constitutive bits was made possible. Indeed, the data process has proved to be transparent thanks to the “bible” of the Minitel's users [8] so that it was possible to create an interface between the machine and our contemporary computers to give the Minitel data to interpret.

This interface, build with an Arduino board and its related software environment, Processing, never compromised the original data process of the initial system: the program sends two sound frequencies, one for 0 and one for 1, the Minitel receives this sound through its DIN connector and decodes it in videotext standards to display the poems offline.

A solution to the missing servers was found by discovering the unknown aspects of the French telematic landscape: the Minitel hackers. They were able, at this time, to hijack the national supremacy of France Telecom's opaque systems to create their own servers. Appeared in 1984 in response to paid services, they do not use the Transpac network but the Public Switched Telephone Network (PSTN). The PSTN is still in place in 2016 and will exist for a long time since it is the main technology used for ADSL by Internet service providers.

By looking for alternative design for this system, alternative stories related to this missing layer of materiality were found. A forgotten path reminding us that solutions can come directly from the past and that “machines and their languages narrate a history and convey an ideology” [9].

MIT ‘techno-social moment’

Involved in another reconstruction project with the ZKM [10] and the MIT Museum since 2012, it made sense to experiment this approach on the reconstruction of the CAVS’ *Centerbeam* [11]. Kind of a modern Phantasmagoria, this outdoor installation is a hybrid between art, science and magic, combining “concepts from art and science to generate illusionism and polysensual immersion using all contemporary means available” [12].

Along the 144-foot-long water prism, among the solar-tracked holograms, the artists seem to use Schröpfer’s tricks of the late 18th to display laser imagery on a ephemeral projection screen made of steam while Otto Piene’s “inflatables” emerge in the sky, as ghost of Joham Karl Ensten’s flying sculptures.

Encyclopedic sum of about twenty optical manipulations, the whole performance is orchestrated by a dedicated custom-made computational and mechanical system.

Never documented in its final state after being performed twice in the late 70s, the goal of the reconstruction would be to narrate and archive the story of MIT “techno-social moment” [13]. Indeed, the MIT Museum, the ZKM and all the artists and engineers initially involved have the significant task to determine which form this complex reconstruction should take in order to give an insight of what was the collaborative ecosystem at CAVS without falling into evocative nostalgia.

After spending one month with these stakeholders at MIT ACT [14], several proposals were suggested. Ranging from versioning to total reinterpretation by younger artists and engineers, the decision-making led to initiate a retro engineering work to be able to reproduce a meaningful experience and find alternative design the closest to the first performances of *Centerbeam*.

To make is to know, to rebuild is to learn, argued the ACT’s students. To reconstruct *Centerbeam*, even under a documentary form, is to reappropriate the knowledge and the memories of CAVS’ social dynamics, spirits and extraordinary machines. In other words, to make the “techno-social moment” alive again. That’s why, even if no new features will be added, some room is let for phantasm and deformed remembers to preserve the vibrancy of the “beast” [15].

To conclude, reconstructing media and digital artworks by using media archaeology theories and retro engineering process, allows preserving the artworks under an informative form in order to make whole again valued knowledge from our singular contemporary cultural memory. Once exhibited, these pieces are entering in collective memory through the viewers’ experience and become knowledge transmitters for those who build them. A layer of materiality when reconstructed, and even more when unreconstructed, narrate this very moment where the tension between past, present and future technologies meet.

Document, archive, pedagogic tool or grave whatever is the reconstructed artwork status, we take the risk, in particular by using alternative histories and “what if”, to create hybrid items, monsters, and Frankenstein media objects. But it is not the spirit of researching and experimenting within the art field?



Fig. 2. *Centerbeam* at Documenta 6, Kassel, Germany, in 1977. © CAVS Special Collection. Photo: Dietmar Löhrl.)

References and Notes

1. Oliver Grau, “Introduction”, in: Oliver Grau, ed., *Media Art Histories* (Cambridge: MIT Press, 2007).
2. Nicholas Stanley-Price, “The Reconstruction of Ruins: Principles and Practice”, in: Alison Richmond and Alison Bracker, ed., *Conservation, Principles, Dilemmas and Uncomfortable Truths* (Oxford: Butterworth-Heinemann, 2009)pp32.
3. Francis T. Marchese, “Conserving Software-based Artwork through Software Engineering”, IEEE Digital Heritage International Congress, Volume 2 (October 2013)pp181-184.
4. Nicholas Stanley-Price [3].
5. Jussi Parikka, *What is Media Archaeology?* (Cambridge: Polity Press, 2012).
6. This practical case has been led by the PAMAL research unit (S.Bizet, L.Broye, P.Galeazzi, M.Stricot and E.Guez).
7. The Minitel (Médium Interactif par Numérisation d’Information Téléphonique) is a terminal connected to a videotext online service accessible through telephones lines, commercialized between 1980 and 2012, in France and abroad. Although it is considered one of the world’s most successful pre-World Wide Web online services, it is not an Internet ancestor since they evolved simultaneously.
8. The STUM (Spécifications Technique d’Utilisation du Minitel) is a user manual meant for an informed public considered as the reference for the study of Minitel’s systems.
9. Emmanuel Guez, “Art et Archéologie des média”, Newsletter Magazine (HEAD, upcoming).
10. Zentrum für Kunst und Medientechnologie, Karlsruhe, Germany.
11. *Centerbeam* is an environmental outside installation initially created for the Documenta 6, in 1977, in Kassel, Germany. This piece of hybrid art, initiated by Otto Piene, was produced by the MIT CAVS (Center For Advanced Visual Studies). A second version was exhibited in Washington D.C. in 1978, in front of the National Mall. The artists involved were (both versions together): Joan Brigham, Lowry Burgess, Harriet Casdin-Silver, Mark Chow, Betsy Connors, Alva Couch, Paul Earls, Derith Glover, Elizabeth Goldring, Christofer Janney, Michio Ihara, Harel Kedem, Gyorgy Kepes, Paul Matisse, Mikael Moser, Muntadas, Carl Nesjar, Otto Piene, Alejandro Sina, Aldo Tambellini and Don Thornton.
12. Oliver Grau, “Remember the Phantasmagoria! Illusion politics of the eighteenth century and its multimedial afterlife”, in Grau [1].
13. Arindam Dutta, ed., *A Second Modernism: MIT, Architecture, and the ‘Techno-Social’ Moment* (Cambridge: MIT Press, 2013).
14. MIT Program in Art, Culture and Technology.
15. “While its hard parts – as opposed to its vital organs, such as the laser – are mothballed in a warehouse, the whole “beast” is asleep like Snow White to be awakened or not.” Otto Piene addressing *Centerbeam* in 1979 in the catalog: Otto Piene, Elisabeth Goldring, ed., *Centerbeam* (Cambridge: MIT Press, 1980).