Proceedings

Third Summit on
New Media Art Archiving

On the occasion of
the 28th International Symposium on Electronic Art, ISEA2023 Paris
(May 19-20, Paris, France)

version 2.0

Terry C.W. Wong & Wim van der Plas, editors

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Proceedings of the
THIRD SUMMIT ON NEW MEDIA ART ARCHIVING
(Version 2.0)

- PAPERS: Artists & Archives -

- ARCHIVE PRESENTATIONS -

-Introduction-

Introduction to the
Third Summit on New Media Art Archiving (3rd SNMAA)

Wim van der Plas & Terry Wong, 3rd SNMAA Directors

The Summit on New Media Art Archiving (SNMAA) series has been a platform and communication channel for stakeholders in new media archiving, aiming to facilitate critical discourse and collaboration. Since 2020, the annual Summit on New Media Art Archiving has become one of the most important and focused conferences for related topics. The Summit engages and connects members of the new media art archiving community for sharing knowledge, exchanging ideas, networking, and seeking collective strategies to tackle mutual archival challenges for the everchanging new media art, the art of our time.

After the massive support for the Liverpool Declaration, the Summit initiative started with ISEA round table discussions on new media archiving at ISEA2018 in Durban, South Africa, and ISEA2019 in Gwangju, South Korea. The one-day First Summit on New Media Art Archiving was held during ISEA2020 (online from Montreal, Canada), featuring a keynote lecture, paper presentations, and break-out sessions. This Second Summit on New Media Art Archiving was held two days preceding ISEA2022 in Barcelona, Spain. Subjects included, among others, archiving physical artifacts, digitising museum collections, ethical aspects of archiving new media art and innovative approaches to archiving, as well as an emphasis on connecting new media art archives worldwide. Part of the Second Summit was a unique art exhibition based on submissions of artworks inspired by the concept of archiving.

The third Summit is being organised by the archivists of ISEA in cooperation with the archivists of SIGGRAPH, Ars Electronica, Archive of Digital Art (ADA), ZKM, the Electronic Language International Festival (FILE), Media Art History, and Memoduct Posthuman archive. The Summit is supported by ISEA2023, ISEA International, the SIGGRAPH Digital Arts Community, and the Creative Industries Fund NL, taking place on May 19 to 20 during ISEA2023, the 28th International Symposium on Electronic Art.

The Topics of the 3rd Summit

The 3rd Summit has three themes: Symbiosis, Sustainability & Progress. These themes are operationalised by inviting paper and panel proposals on the following topics:

1. Building on the results of 1st and 2nd Summit
2. Making the Summit a sustainable event
3. Ideas and proposals to help the Connecting Archives project
4. New Media Art Archive presentations

Topic 1. **Building on the results of Summit 1 & 2**

The Summit series has addressed some critical concerns and various relevant subjects for the different shareholders in the new media art archiving community. Some Topics from the 1st and 2nd Summit are:

- Museums and the Integration of Digital Arts
- Communication and Coordination among Archivists
- Cooperation among Museums and New Media Art Archives
- Developing and Maintaining Physical Archives
- New Directions in Online Archiving
- New Technologies for Archiving (AI, VR/AR, Graph databases, other)
- Individual Artists & Archiving
- Ethics in Archiving

Topic 2. **Making the Summit a sustainable event**

The Summit series has been an initiative of the ISEA archivists, who organised the Summits on a volunteer base. They have worked without financial means and at the cost of their regular archiving work. To make the Summit a sustainable event, it is crucial to investigate how we can give the Summit a real organisational basis and look for stakeholders who would be willing to invest in the Summit,

Topic 3. **Ideas and proposals to help establish a global archiving network**

The Summit series has gained support from the new media art archiving community, with a growing number of international archive partners. Progressively, as of today, the partners have formed a core group. Moreover, as a result of the first Summit, an initiative of the Connecting Archives Project was started, intending to connect databases between different institutions worldwide, enabling sharing of information and cross-institutional research for new media art. Ideas and proposals are invited to help connect archives worldwide, eventually leading to the possibility of forming an international consortium for new media art archiving.

Topic 4. **New Media Art Archive presentations**

> The subject of archiving and preservation of the rapidly changing new media art has become a growing demand worldwide. New media art archives from around the world are invited to present their work at the Summit.

The Creation of the 3rd Summit Programme

After the publication of the Call for Papers in November 2022, a large amount of anonymised proposals was received. The Summit directors divided these among the members of the International Programme Committee (IPC, see below). The submissions for Archive Presentations were only checked for relevance (are they on new media art archiving, and not a repetition of earlier submissions?) by analogy with Institutional Presentations in the ISEA Symposium programme. All paper and panel proposals were reviewed by 2 IPC members and scored on the following criteria: relevance to the topics, the significance of the subject matter, quality of the work, quality of writing, and overall impression. After the double-blind reviewing process, the IPC met online and took final decisions. Some of the proposals were accepted by one IPC member and rejected by the other. In those cases, a third or even a fourth reviewer would add their reviews, leading to a definite decision.

All submitters were informed in February 2023. Most of the accepted authors were asked to improve their paper at particular points, based on the comments by the reviewers. Among other things, this often concerned the formatting, that was required by ISEA2023. Of course, all papers were then un-anonymised also.

We did not get proposals on all subjects that passed by during the first two summits (ethics, for example, an important issue at the 2nd Summit, did not get much attention this time). Also, On the basis of the accepted proposals, the IPC agreed on the following categorization:

- Artists & Archives
- Opening New Media Art Archives To The World
- XR & Metaverse
- Connecting Archives
- Future of the Summit (Panel)
- Archive Presentations

All papers are included in these Provisional Proceedings, including the Panel Statements and the Archive Presentation Statements. Nevertheless, they are provisional, on the one hand, because some improvements are still expected, and on the other, more importantly, because we would like to include the results of the panel discussion on the future of the Summit. A report on this subject will be included in the final Summit Proceedings, that will be an appendix to the ISEA2023 Proceedings. About the future of the Summit a few words at the end of this introduction.

Final Programme

May 19, 2023 [Day1]

`14:00` **- Opening -** Chair: Terry Wong/ Wim van der Plas (ISEA Archives)

- Welcome by Klio Krajewska (ISEA2023)
- Introduction by Oliver Grau (Media Art Histories)

`14:10` **- Invited Talk -** Chair: Terry Wong/ Wim van der Plas (ISEA Archives)

- Franck Ancel — *Jacques Polieri's archive at the National Library of France : from scenography to zerography or an art of memory*

`14:25` **- Artists & Archives 1 -** Chair: Violeta Vojvodic Balaz (Memoduct)

- Manuela Naveau, Irene Posch, Martin Krickl & Sophie Hammer — *Archiving the In-Between: ONB-Labs Art Program – Artists engaging with digital collections of the Austrian National Library*
- Wolfgang Strauss* & Monika Fleischmann* — *Exploring the Digital Archive as a Thinking Space – AI Aspects on Documentation, Access and Knowledge Discovery*
- Raphael Tsz Kin Chau — *From self-documentation to federated querying using Wikibase: a new topology to Media Art Archiving?*
- Tilman Baumgärtel — *Presenting "Piazza Virtuale" in five different ways: On using common.garden and other media for access to archived media art works and academic research*

`15:45` **- Break -**

`16:00` **- Archive Presentations 1 -** Chair: Margit Rosen (ZKM)

- Bonnie Mitchell & Janice Searleman* — *ACM SIGGRAPH History Archive Comes Alive: 50 Years of Innovation, Creativity and Ground-Breaking Achievements*
- Terry Wong, Wim van der Plas, Bonnie Mitchell & Janice Searleman — *ISEA Symposium Archives: Recent Developments*

`16:15` **- Opening New Media Art Archives To The World -** Chair: Felix Mittelberger (ZKM)

- Jose-Carlos Mariategui — *Strategies and Conditions of Video Art Collections in Latin America*
  Delma Rodriguez Morales — *Leaving our comfort zone. A proposal to co-create appropriation in Media Art Archives for their sustainable future*
- Juergen Hagler, Wolfgang Hochleitner**, Patrick Proier** & Christoph Schaufler** — *Looking Back on 10 Years of Expanded Animation*

Symposium: Organizing, Documenting and Archiving Together with Students
- Madeline Smith, David Cirella**, Ethan Gates** & Claire Fox** — *Preserving a Hardware-Dependent Digital Artwork: Investigating Disk Imaging and Emulation Strategies*
- Amanda Long* — *Copy-It-Right. The Distribution Religion: The Media Archaeology of the Sandin Image Processor*

`17:55` **- Closing of Day 1 -**

May 20, 2023 [Day2- Morning]

`09:00` **- Panel 1 -** Chair: Carl Philipp Hoffmann (ADA)
- Alexandra Dementieva, Anna Frants, Janine Randerson* & Natalia Kolodzei* (moderator) — *Art Data: New Frontiers in Curating, Preserving, Displaying and Connecting Digital Based Arts*

`09:30` **- Artists & Archives 2 -** Chair: Carl Philipp Hoffmann (ADA)
- Alexandre Michaan & Philippe Bettinelli — *When interactive artworks act as archives: migrating and documenting Immemory by Chris Marker*

`09.50` **- Archive Presentations 2 -** Chair: Fabiana Krepel (FILE)
- Arie Altena — *Activating Archival Research at V2_*
- Andrew Gryf Paterson — *Auto-archiving 20 years of Pixelache Helsinki*
- Aleš Vaupotič, Eszter Polonyi, Narvika Bovcon & Jaka Železnikar — *Sustainable digital preservation of the new media art*

`10:10` **- XR & Metaverse -** Chair: Juergen Hagler (University of Applied Sciences Upper Austria)
- Ze Gao*, Zheng Wang & Xingxing Yang — *Immersive Possibilities: Archiving Sound Art of Live Performance in the Context of the Metaverse*
- Zeynep Abes* — *The VR Archive Project*
- Zheng Wang & Ze Gao* — *An Immersive Multi-Screen VR System for Museum Archive Browsing in the Age of Metaverse*

`11:00` **- Break -**

`11:15` **- Opening New Media Art Archives To The World 2 -** Chair: Paula Perissinotto (FILE)
- Andrea Tešanović* — *Cyberfeminism Index: Noah's Archive of Cyberfeminist Art and Culture*

- Víctor Fancelli Capdevila — *Digital strategies as our common challenge: The work of Open Resource Center and AuDA*

11:45 — Archive Presentations 3 —   Chair: Alejandra Crescentino (Autonomous University of Madrid)

- Laura Baigorri* & Diego Marchante* — *Connected archives. New archive interfaces from queer and open-source strategies*
- Vanina Yael Hofman & Valentina Montero* — *PAM (Plataforma Arte y Medios) – Archiving and Disseminating Media Arts from Latin America*
- Hiroko Kimura-Myokam* — *Toshio Iwai Archive and Research*

12:15 — Lunch Break —

May 20, 2023 [Day2- Afternoon]

14:00 — Archive Presentations 4 —   Chair: Bonnie Mitchell (ISEA & SIGGRAPH archives)

- Christina Radner — *Ars Electronica Archive: current developments and plans*
- Margit Rosen, Felix Mittelberger, Morgan Stricot, Christian Haardt, Hartmut Joerg, Matthieu Vlaminck & Dorcas Müller — The ZKM | Center for Art and Media Karlsruhe Archives
- Fabiana Krepel & Paula Perissinotto — *FILE Archive*

14:25 — Connecting Archives —   Chair: Byeongwon Ha (University of South Carolina)

- Terry Wong — *Global Archive Network: The 2nd Summit Case Study Report*
- Paula Perissinotto & Dalton Martins** — *Interoperability among the digital repository Tainacan and the information networks Wikidata and Wikimedia Commons: A case study of FILE ARCHIVE*
- Myrto Aristidou, Theopisti Stylianou-Lambert, Kleanthis Neokleous & Kyriaki Yiakoupi — *The Emerging CYENS ArtTech Archive: Affordances and Opportunities of an R&I Institution as an Arts & Technology Stakeholder*
- Erika Fülöp & Dene Grigar* — *Piloting Shared Born-Digital Archives between the US and Europe*

15:45 — Break —

16:00 — Artists & Archives 3 —   Chair: Carla Milena Zamora (ADA)

- Andrea Sick, Irena Kukric & Marcela Antipán Olate — *Imaginaries in Becoming: The Dynamic Archive*

- **Cyrus Khalatbari** — *Method for Design Materialization (MDM) for artists, educators and archivists: an introduction*

16:35   - Panels 2 -   Chair: Oliver Grau (Media Art Histories)

- **Carl Philipp Hoffmann**, **Paula Perissinotto**, **Terry Wong**, **Bonnie Mitchell** & **Oliver Grau** (moderator) — *Bridging Knowledge: Connecting New Media Art Archives*
- **Violeta Vojvodic Balaz**, **Wim van der Plas**, **Terry Wong**, **Bonnie Mitchell**, **Janice Searleman***, **Byeongwon Ha** & **Oliver Grau** (moderator) — *Summit on New Media Art Archiving: Strategic Planning for the Future*

17:45   - Closing Remarks -

All presenters are marked with an <u>underlined.</u>
Planned remote presenters (*), and Pre-recorded video presenters (**)

Summit Committees

3rd SNMAA Organising Committee

- Wim van der Plas, ISEA Archives
- Terry Wong, ISEA Archives

3rd SNMAA International Programme Committee

The International Programme Committee (IPC) is formed with representatives of the Summit partners, experts, and active members in new media art archiving.

- Violeta Vojvodic Balaz (MEMODUCT posthuman.archive)
- Alejandra Crescentino (Autonomous University of Madrid)
- Oliver Grau (ADA & Media Art Histories)
- Bayonwon Ha (Univiesity of South Carolina)
- Juergen Hagler (University of Applied Sciences Upper Austria)
- Carl Philipp Hoffmann (Danube University/ADA)
- Fabiana Krepel (Electronic Language International Festival, FILE)
- Bonnie Mitchell (ISEA & SIGGRAPH archives)
- Felix Mittelberger (ZKM collection & archive)
- Paula Perissinotto (Electronic Language International Festival, FILE)
- Wim van der Plas (ISEA Symposium archives)
- Christina Radner (Ars Electronica archive)
- Margit Rosen (ZKM collection & archive)
- Janice Searleman (ISEA & SIGGRAPH archives)
- Terry Wong (SFU/ISEA Symposium archives)

Final Words

The Summit on New Media Art Archiving 'grew out of' ISEA, the International Symposium on Electronic Art. The ISEA symposia of 2020, 2022, and 2023 have fully co-operated in the realisation of the first 3 Summits. For the time being, however, its status is rather undefined. As it has so far been organised by the ISEA Symposium archivists, at the cost of their archiving work, new blood is needed. The more since the ISEA Symposium archivists are all unpaid volunteers. The Summit organisers are talking both with ISEA International and with other partners to find out how the future of the Summit can be secured. The initiative is too important to let it fade away.

Wim van der Plas & Terry Wong,
3rd SNMAA directors

3rd Summit - Opening Remarks

Oliver Grau

The wonderful city of Paris hosted during ISEA the third Summit on New Media Art Archiving, giving the opportunity to further develop our field and critically discuss how to make our work even more collective, more efficient, and better supported? For me personally, it has been a long journey: Next year it will be 25 years since the founding of the *Archive of Digital Art*, the scholarly documentation of digital arts, and it was in Paris, 21 years ago, where ADA was first presented internationally at the Louvre.[1] Since 2005 in the framework of the first *MediaArtHistories Conference* in Banff/Canada[2], happening this September in Venice for the 10th time, we always had a section dedicated to our digital tools. And, as probably everyone knows, since 2011, hundreds of colleagues from academia and major museums of more than 40 countries have signed the *Liverpool Declaration* developed at the MediaArtHistories Conference, calling for an interoperable and sustainable structure for our archives.[3] Since then, everyone can use the declaration, which has led to numerous funded projects. However responsible cultural policy needs to be much more aware for scientific documentation and preservation of the art of the last decades, as most still disappears into the digital "black hole".

For the upcoming connection of archives, the question remains: How broadly do we create the keyword bridges? Yes, quick connections can be established with artist names through Wiki but in the medium term we need to go for scientific keyword bridges trained for example on the Getty AAT[4] and Warburg Index, such as the Bridging Thesaurus, which enables connections into art history through its hierarchical keyword bundles[5] and within a common research project with ADA Christa Sommerer and her team developed even an augmented reality keyword interface for a walk-through archive.[6]

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[1] For an expanded Concept of Documentation: The Database of Virtual Art, ICHIM, École du Louvre, Cultural institutions and digital technology, acte publié avec le soutien de la Mission de la Recherche et de la Technologie du Ministère de la Culture et de la Communication, Paris 2003, Proceedings, CD-Rom, 2-15. Datenbank der Virtuellen Kunst, in: Electronic Imaging and the Visual Arts 2001, Berlin 2001, 135-140.
[2] https://www.mediaarthistory.org/?page_id=80
[3] https://www.mediaarthistory.org/wp-content/uploads/2017/09/MAHDeclarationList.pdf
[4] https://www.getty.edu/research/tools/vocabularies/aat/
[5] Grau, O.; Haller, S.; a.o. (2019). Documenting Media Art: An Archive and Bridging Thesaurus for MediaArtHistories, in: LEONARDO, 52: 435-441.
[6] Tiago Martins, Christa Sommerer, and Laurent Mignonneau, AR[t]chive – Augmented Reality Experience for a Digital Art Archive.
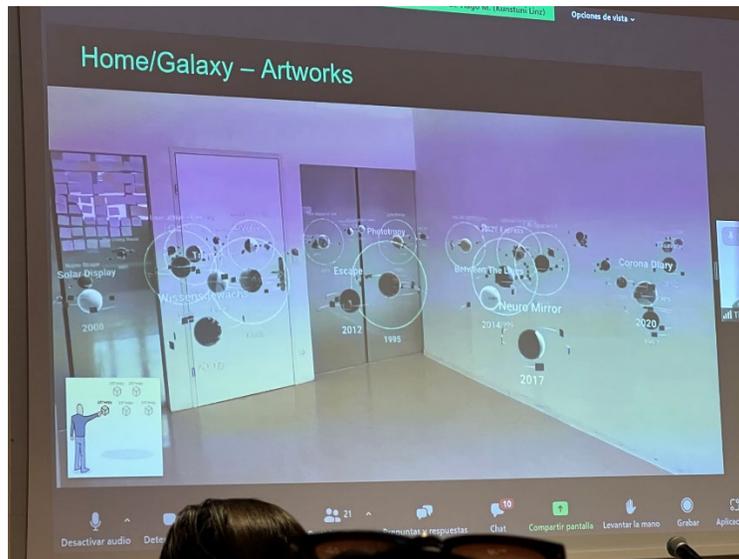
©ISEA2022: 27th International Symposium on Electronic Art, Tiago Martins, Christa Sommerer, and Laurent Mignonneau, AR[t]chive – Augmented Reality Experience for a Digital Art Archive.

Even in the educational sector, at art universities, museums etc., there have been no such research instruments to date, like those that for example astronomy has collectively developed on an international level with the *Virtual Observatory* based on stable funding structures and data standards.[7] The arts and humanities on the other hand, coming often from national cultures, must be given the opportunity to act as well on a sustainable basis globally. This can ensure that at least some important of the countless works of digital art in areas such as climate, migration, or surveillance are brought into awareness and international debate. Only then can a democratic society with a tax-funded art system be helped to think through the big questions of its time based on its own art. As we know, neither documentation and archiving nor collection of digital art forms happens in a systematic, concerted way. Worldwide there are at least 55,000 museums, of which roughly 10% are dedicated to art, in Germany 700, but so far digital art is collected and preserved only sporadically. With the current digitization thrusts though we must expect rapid progress, as our documentation archives represent the scientific basis for this change.

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[7] "The International Virtual Observatory Alliance (IVOA) was formed in June 2002 with a mission to "facilitate the international coordination and collaboration necessary for the development and deployment of the tools, systems and organizational structures necessary to enable the international utilization of astronomical archives as an integrated and interoperating virtual observatory. (..) The IVOA now comprises 22 VO programs .. and an inter-governmental organization (ESA). Membership is open to other national and international projects according to the IVOA Guidelines for Participation. The work of the IVOA focuses on the development of standards. Working Groups are constituted with cross-project membership in those areas where key interoperability standards and technologies have to be defined and agreed upon. The Working Groups develop standards using a process modeled after the World Wide Web Consortium, in which Working Drafts progress to Proposed Recommendations and finally to Recommendations." https://ivoa.net/about/what-is-ivoa.html

-Invited Talk-

From Scenography to Zerography

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Abstract

After speaking many times about the French scenographer Jacques Polieri (1928-2011), a major precursor for the history of media art, on the occasion of several ISEA meetings, a study day is organized, with the help of Federico Biggio (an academic media semiotician) during the 2023 edition at the National Library of France between "scenography and/or symbiosis" the theme in Paris.

Keywords

Scenographer, Zerography, Jacques Polieri, BnF, Archive, ISEA2006, ISEA2023

Introduction

This year 2023 is also the 40th anniversary of a historic video conference by Jacques Polieri "human-machine inter-face" between New York, Tokyo and Cannes in 1983. A ret-rospective had already been exhibited 20 years ago at the National Library of France but in the "classic" form of an exhibition of models, plans and other archive documents. But how else to transmit and study this work from its ar-chives to publish a new document, between paper book and online data?

It's here that the concept of zerography developed by Franck Ancel since the research of Jacques Polieri can be unfolded for a rereading of his work in three deployments: a symbiosis of artistic disciplines, a spatial schematization as fiction then the desire to leave gravity in space.

The hall in Paris for "scenography and/or symbiosis" will welcome 64 people in the room, 12 contributions and inter-ventions via Zoom. All the words will be recorded and will be analyzed multiple times to identify key words but also a graphic equivalence, a process that we are presenting in Venice too for Media Art History..

As he had participated in the first edition of Media Art History in Banff in Canada, or ISEA2006 at San Jose in US, Franck Ancel offers on ISEA2023 Paris during this 3rd Summit on New Media Art Archiving, today a new light on Jacques Polieri to re-think his archives at the BnF (National Library of France). [1]

It is a question of talking about this important study day, the 15th May 2023, in Paris, English and French during ISEA2023, but above all of offering you, through our com-munication, the materials to imagine something new... As a specific example, how to show the video program of Jacques Polieri's video-conference in 1983 today if we can no longer

decode the videotape which is nevertheless in the bottom of the Polieri archives in BnF? It is therefore for us to produce a new device other than an exhibition scenography.

References

[1] Franck Ancel, "From Scenography to Planetary Network: Shanghai World Expo 2010 at ISEA San José 2006", (Published as the ISEA2006 Issue of Intelligent Agent, #2, 2006) *Proceedings of the 13th International Symposium on Electronic Art*, and ISEA2006 Publications, accessed May 09, 2023.
https://www.isea-archives.org/docs/2006/papers/ia6_2_interactivecity_ancel_shanghai.pdf

Author Biography

Franck Ancel. It was in 1987 that Franck Ancel began to take an interest in the electronic arts in relation to the avant-gardes of the last century. Then he worked with the scenographer Jacques Polieri (for more than ten years with him) whose retrospective he coordi-nated at the National Library of France and then exhibited in Ber-lin. He has given dozens of conferences on several continents. While paying tribute in 2007 to the 50th anniversary of Sputnik during a streaming-installation-performance, as he has been pro-ducing since 2001, he decided to start psychoanalysis in Paris. Franck Ancel is now installed as a psychoanalyst in Paris but he also teaches art history in this city. His concept of zerography after Polieri's scenography is not unrelated to the conquest of space be-yond the abstraction of the last century. He is still trying to write an S/Z thesis "from scenography to zerography". But he recently participated in the 50th anniversary of Carl Sagan's satellite by sending 8 prints between a combination of a sign and an art of memory, during the flight of the ZEUS 1 satellite by Space X at the invitation of the private company QOSMOSYS.

-Papers: XR & Metaverse-

Immersive Possibilities: Archiving Sound Art of Live Performance in the Context of the Metaverse

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Abstract

This article introduces the new dynamics and challenges in making sound art virtual while posing new questions about previously neglected aspects, such as archiving sound in a virtual space. By referencing the historical examples of Ryuichi Sakamoto and Nam June Paik, this article recognizes the limits of previous archiving methods and technologies while revisiting the essential question of power under emerging media and algorithms. With a focus on virtual archiving, this article investigates the new boundaries of sound art in an updated context while advocating an alternative framework to evaluate the relationship between the virtual and real, not only as a fluid location as put by Gilles Deleuze, but also as an integrated system to be located in time and space.

keywords

Sound Archiving, Sound Art, Live Performance, Virtual Reality, Immersive, Metaverse

Introduction

Sound art has been a crucial part of human aesthetics for millenniums. Although it has taken various forms and directions throughout history, its charm keeps tempting us to ask the one question: How can we obtain a more immersive experience of sound art? This question, historically related to "fidelity", now extends to "immersiveness" as technology has pushed forward the boundaries of both scope and quality which are crescively interrelated.

In "Polyphonic Materiality in Extended Reality," Australian scholar Kate Geck reframes this "immersiveness" as the replacement of the physical with the virtual and a polyphonic assemblage: "We interact between physical objects and digital surfaces [6]." Additionally, Keck usefully points out the necessity of "dismantling" the conflation between the real and virtual while emphasizing the agential "realism" of the digital. What is missing here are the specific circumstances under which the "assemblage" occurs and this "realism" works or needs to work, which touches down to the differences and consistencies of interactions. To examine

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these patterns, although previous scholars in archive studies have shown interest in digital materiality and stewardship along with the interactive potential in "fostering innovative, expressive communication [13]," the idea of performance and archiving has been confused, and their relationship remains nebulous. Additionally, while articles like "Multi-Generation Digital Stewardship: XR Art & Technology Archives" has teased out the synthesis of the preservation and production, the ontological, social, and aesthetic consideration is lacking in "baking" the preservation and management of digital content "into the production process [9]." Besides, social and art-historical connections in archive studies are downplayed as compared to traditional mediums and performative elements.

To build on the research above, we should return to the process of producing immersiveness and its objectives. Logistically, the question of sound art is also twofold: How do we render both performance and archiving immersive? The latter entails urgent attention and engagement from scholars, artists, and engineers.

We can find previous attempts at answering the question in the history of new media art, which illustrates provocative possibilities. In 1980, German electronic music pioneer Klaus Schulze opened the Ars Electronica Festival with a live recording of a concert, challenging the boundary between "live" and "archive" in a performative way. Since then, "Digital Music & Sound Art" has been a category of Ars Electronica for decades. However, it was not until recently that the rise of the metaverse opened the door for immersive archiving and performance. Overall, finding pointers to references was still uncommon. Nevertheless, this has been somewhat altered by "Robots, Bass, and Hot Algorithms!" (see Figure 1) by Portrait XO, Moritz Simon Geist, for Ars Electronica. Additionally, Nelo Akamatsu's "Chijikinkutsu" (see Figure 2), which won the Golden Nica for Digital Music and Sound Art in 2015, exemplifies the exciting developments in this field. More recent examples continue synthesizing performance and archiving as a new methodology while expanding performativity. Championing the spontaneity and transferability of the archived and ready-made sounds from modern and historical Japan, Japanese digital musician Meitei redefines the role of sound archiving and foregrounds its potential in the immersive future.

In this vein, this article evaluates the current challenges and specific proposals for archiving sound art in the metaverse to reconsider live performance. It also examines the relationship between sound-art archives and the metaverse community from a social perspective.

Figure 1: Robots, Bass, and Hot Algorithms! / Portrait XO (US), Moritz Simon Geist (DE).

Figure 2: Chijikinkutsu –Installation view, Blue Project Foundation, 2018 – Courtesy Blue Project Foundation, ph Nelo Akamatsu.

Before we delve into the archiving aspect, being familiar with certain figures and the history of sound art is conducive. Starting with Asia, Ryuichi Sakamoto is one of the forerunners of contemporary experimental sound art. He believes technology is the key to maintaining a holistic awareness of the world [1]. Since the late 1970s, he has been key in redefining the intersection between sound and art in Japan and internationally. His works range from his film scores, for which he won an Academy Award and a Grammy in 1988, and his influence on the development of electronic music through the Japanese Band Yellow Magic Orchestra (YMO), to his active work on climate change, remaining an essential reference in the scene [2]. The "async" was released in 2016 as his artistic exploration of electronic music and unique experimentation on ambiance.

It is equally important to highlight his attitude toward archiving. From analogs to optical discs and his online concerts, which can be accessed through live streaming and archived replays, Sakamoto has always been mesmerized by the ideas of "misunderstanding" and "spatiality," which became more conspicuous in his recent works. In 2021, his

audio-visual exhibition "Seeing sound, hearing time" in M Woods Hutong Museum, Peking, demonstrated his concept of "installation music" in which sound becomes a spatial entity through a shared space of audio-visual-environmental effects. In such a space, the sound is often recycled and recollected as recursion, and this process reconfigures the physical space, rendering it synesthetic and absorbing. In another work, "Is Your Time (2017)," which incorporates a piano washed up on the shore after the tsunami from the Great East Japan Earthquake in 2011, he observed the encounter of memory and archiving. The archived sound of nature now involves object- and memory-archiving, conferring a transcendental sensibility to the technical act of archiving. The concept of "misunderstanding" also recurs in this action as Sakamoto often laments and celebrates simultaneously the "impossibility" of recreating even his old works: misunderstanding makes any archiving a necessary "mistake" while laying the ground for creating something "new". In other works involving natural sounds, archiving became the main method of creating a piece because nature cannot be asked to replay or perform at will. Accordingly, "misunderstanding" and "spatiality" construct Sakamoto's attitude towards archiving and performing, which converges rhythmically throughout the process.

While Sound Art of Live Performance is still in its sunrise phase, its popularity has far-reaching implications, thus making its archiving equally crucial. As a form, although live performances can be broadcast easily through national or private outlets, archiving this type of work in an immersive manner will become increasingly difficult as time and volume accrue. This situation called for a flexible and durable medium to accommodate the increasing demands of artists and audiences alike. With the rapid development of metaverse technology, Ryuichi Sakamoto's Sound Art of Live Performance and the work of many other sound artists will conceivably become less challenging to archive while obtaining greater longevity, sustainability, and accessibility. Specifically, this article summarizes two methods of archiving live performances in a metaverse: audio rendering and music visualization. Through the two methods to be discussed, the immersive experience, the integrity of the work, the authenticity, and the anytime, anywhere access to these properties are amplified. This possibility of archiving also returns the power to the audience, often monopolized by the company or the performer.

Related Work
Sound has consistently been an integrative factor throughout the history of new media art, although it is debatable what defines this "newness" exclusively. This "newness" often connects emerging subject matter and media technology. Previously, it can be explained by the "five principles of new media", so insightfully put by Lev Manovich in *The Language of New Media*. They are numerical representation, modularity, automation, variability, and transcoding dcitemanovich2002language. The last two characteristics are the most relevant because variability can be understood as the dynamic of techno-sensory connection whereby the immersiveness is gradually enriched and complete. The last princi-

ple of "transcoding" also demands our attention, especially from an audial perspective. In the specific act of archiving, the human and machine cooperate in recreating sounds while constantly influencing each other's choices. In this process, archiving never remains a one-way input of passive actions.

In the same book, Manovich uses transcoding to describe the blend of computer and culture and "traditional ways in which human culture modeled the world and the computer's means of representing it [15]." In sound art, "transcoding" takes on another meaning: the computer will represent the sound based on the human model. At the same time, the human sound will also increasingly imitate its counterpart. This blend explains the development of immersiveness in curation and art practice. More profoundly, it accounts for a strong narrative already latent in art history: to be immersive has always been one of the objectives in performing and archiving contemporary art as if the "immersiveness" or "completeness" equates to the artistic "truth" that both Plato and Merleau-Ponty sought after. Without archiving, performance art would cease to grow and reach its audience.

For example, Nam June Paik's video-audio performance at "Good Morning, Mr. Orwell" demonstrated blending the human and computer sounds manual by patting the monitors and maneuvering the knobs, setting an early example for today's DJ or VJ or even the live performance in metaverse because the show was also broadcast live to a global audience. WNET TV traditionally archived the performance, but its tape copies soon hit the shelves of museums and bookstores. With the advent of the Internet, this performance was soon incorporated into multiple Youtube and website collections of early media art, prolonging the life of the performance again. The only difference lies in resolution, accessibility, and how the audience and artists interact. Most importantly, the archiving technology was also unsatisfactory, making the TV show almost a singular event, and all the latter renditions had to follow its singularity. Accordingly, there remained a time limit and quality compromise, which were inevitable. We can access Paik's magnificent sounds through YouTube or other streaming platforms. However, these platforms, with or without licenses, still acquired the video from the original tape the TV station kept, as how an accountant would archive his/her ledgers. This method was still confined to the materiality of the tape itself and sometimes the original quality of the recording when the sound occurred and, presumably, the soft and hard system of the TV station, the institution itself, always a centralized and hierarchical structure susceptible to a multitude of capriciousness and human factors.

Throughout art history, we also realize that the performing and archiving of sound art are always profoundly connected and intended to be studied together. Harking back to even earlier examples of sound art, such as the vinyl players, the soundtrack in a movie, or even the laser-cut DVDs, they are all at the mercy of the elements and, without doubt, subject to the institutions behind the performing and, archiving process, in which the emphasis was often put on the former. The situation will become more desperate when we consider other examples, such as the sound in a theater play or

Shakespeare's reading. While some would also argue that art is born to be brief and singular (and that's where the aesthetics lie), they still cannot deny that by relocating the temporal-spatial happening (as in the beginning, duration, ending, and archiving) of these events to alternative spaces such as metaverse or a virtual platform, we usher in other possibilities such as us today ruminating Paik's art almost four decades later in a room thousands of miles away from the original New York or Paris showroom. . . . . . on YouTube, a platform which only takes a smartphone, electricity and the Internet. Overall, art history would make us wonder how to classify and archive sound if materials became a minimal issue and only the performance quality mattered. Additionally, the new media has marked many watershed departures from its predecessors; the How question of archiving still revolves around power, especially the power behind the algorithms, which are inescapable from human aesthetics and decisions. One might ask who would decide what and how to archive beyond the engineers, given that the material problem of archiving has become obsolete. This question pushes us to look deeper into the details of a metaverse.

Technologies that can be supported at the current stage

Following the trail above, we must also understand what makes a metaverse and how sound works in such a space. Only with this background can we apprehend how archiving works differently in the metaverse. Quintessentially, a metaverse is a network of 3D virtual worlds focused on social connection, which is often represented in the form of VR (Virtual Reality) and AR (Augmented Reality). From the currently available literature, researchers have conducted research in several sub-fields on music in VR and AR, including audio rendering, music visualization in VR, VR music video, music performance and virtual instrument, etc., which sheds light on how we can use currently available technologies, especially during the archiving process.

Audio Rendering

Ambisonics is a full-sphere surround sound format [23]. It can be decoded into binaural rendering that users can listen to in stereo earphones, providing an immersive experience by closely matching the natural sensorium. F. Grani et al. conducted an experiment to compare user preferences towards stereo and binaural rendering with visual and the result showed that participants preferred binaural sound congruent with visual, followed by stereo [7]. Moreover, A. R. Bargum et al. made a virtual reconstruction of the ambisonic concert hall of the Royal Danish Academy of Music in VR, which indicated that the simulated room matched its real one in terms of efficacy [3]. J. Janer et al. conducted another experiment, which tested the auralization of sound sources of recorded live content [10]. Based on the angle and distance between the listener and the source instrument, the listener would perceive the sound with varying intensities and at different times in both ears. When pointing at a specific instrument, users could listen to the augmented sound of the particular instrument. Though major differences remain be-

tween actual and virtual situations, the research above shows the practical realization of mapping real-world acoustic experience into virtual reality with some promising directions.

In an ambisonic metaverse, if the audience could engage the live performance with minimal and natural gestures as close as it would be to an actual happening, its archiving would mirror this mechanism. The recording of the event would happen simultaneously and work to remember not only the event's details but also the audience's interactions, thus forming a pattern for the future audience and performance. Moving forward, the next audience would follow similar interactive patterns as in the previous happening while being archived again in the database. On the one hand, real-time interaction preserves the fidelity of the original or actual performance without deterioration. On the other hand, the accruing process compliments archiving and performance, and the entire process is self-learning to produce a better experience.

Music Visualization

Another element to be considered in archiving is music visualization. There are some existing experiments in VR. For example, B. I. Outram adopted an "orbital mode" interaction technique which allows unprecedented hands-free user observation and navigation control. The image-based visualizations for several tracks were also utilized [20]. Jonathan Weinel created several synaesthetic audio-visual toys in virtual reality through symbolic representation and switch-based music genres or other stimuli to enhance the experience [22]. There are also examples of visualizing music in AR. For instance, Markerless AR music visualizer animates music spectrograms in AR[1]. Another example Beatsy is an augmented reality music visualizer for iOS that uses your music or voice to modify the world around you [2].

Similarly, this practice can also be incorporated into the archiving process, realizing its creative potential. For instance, the audio-visual toys in the archiving could adopt a dynamic mode of changing forms responding to the new audience, different from its previous appearance in the live performance. In the actual performance, the visual presentation must follow the designer's or artist's plan (or agenda, at least) as meticulously drafted beforehand. In contrast, instead of remaining in the original forms, the VR and AR visualizations can also be played with in terms of order and content. While the original copy is saved, the archiving can take creative routes as if a curator selected the gallery for the old collection. Meanwhile, the question "if the archive can become an editable open source artwork" will become a possibility to consider: Can the archivist and audience change the visualizations? What is the agency of the artist and the metaverse community?

Music Video

As a three-dimensional development of music/audio visualization usually based on symbolic patterns and audio analysis, VR music videos for customized content are also found in existing works, showing how one can perform and archive VR performances. According to the research of G. W. Young et al., [27], compared to 2D images, VR MV, as a new format that utilizes cutting-edge technology, provides users with a higher sense of immersiveness and presence, which will possibly encourage new positions and skills in the music industry. "What do we care 4" is a VR music video nominated for the UK Music Video Awards 2015 in the category Best Interactive and innovative Video [19]. The work features a live performance recording in a VR music video. "Echoes of Murlough" is another VR MV with an electroacoustic composition presented in VR [17]. This piece highlights the ambisonic composition of the recorded natural sounds and instruments within the environment of Murlough Beach, Co. Down, in Northern Ireland. The same artist, Gareth W. Young et al., recorded another VR MV featuring new pagans, which utilized volumetric video capture and 3D modeled world building (see Figure 3.) [26]. The session was captured simultaneously across twelve video cameras. Beyond artworks found in academic literature, there are also commercial cases. For example, Björk released an album, "Vulnicura", which allows users to explore the Icelandic locations which inspired Björk's songs (see Figure 4.) [3]. If the above examples are all somewhat based on the real life recording, "Squarepusher Stor Eiglass" is a VR MV that mixes electronic music with imaginative animated 3D dynamic scenes [4].

What the works above show in common is the virtual archiving of video relatively independent of its original environment or source. If the live performance is predicated upon virtual modeling, the archiving will follow the nature of this virtuality. The recording no longer needs to happen in the real world and is later transferred to the virtual. Still, it becomes an entirely virtual process – a virtual recording of the virtual, which maximizes the traceability and capturing capacity of the camera. The second VR videos start playing, and the performance becomes the evolving archive per se, a plural event connecting Björk's Iceland, the engineers' studio, and your laptop. When the performance ends, the preliminary archiving has been completed – the two actions are now synchronized and inseparable. Furthermore, the VR music video also questions the originality of the environment if originality itself has become plural: the originality of the modeling, the music, and the presentation (performance and archiving). This archiving has allowed universal participation in deconstructing the original work. With the rise of auto-tune remix-themed content wryly related to original videos, the action of archiving, as in what should be archived, how, and why, has become a social question.

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[1]https://www.youtube.com/watch?v=sNnIczmsr2Qab$_c$hannel = Designium

[2]https://www.youtube.com/watch?v=duil2n6jZAAab$_c$hannel = MattBierner

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[3]https://en.wikipedia.org/wiki/Vulnicura

[4]https://www.youtube.com/watch?v=6Olt-ZtV$_C$Eab$_c$hannel = WarpRecords

Figure 3: Featuring New Pegans
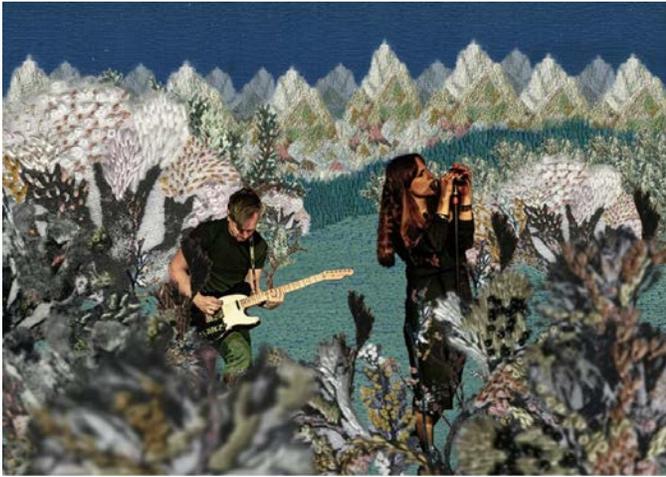
Figure 4: 'Vulnicura'.

Social Experience

Social analysis of live performance also pertains to archiving. From Charron, J. P.'s analysis [5], he concluded that virtual reality concerts could improve virtual participants' perception of being there, which is an essential factor for concert-goers. He also raised two essential questions requiring further research near the end of the article. One is how to increase participants' engagement and improve the virtual concert experience in the physical absence of others. The other is how future developments in immersive technology will affect the virtual concert experience and the demand for live performances. T. Kaneko et al. conducted related research exploring the sense of unity in VR concerts, echoing the first question (see Figure 5.) [11]. The results showed that exchanging nonverbal communication with body actions [pushing up a fist, rhythmically shaking a hand, waving a hand, clapping, jumping, moving (moshing), and holding a chemical light] between audiences in a VR environment helps elevate the sense of unity for participants. From the performer's perspective, R. Hamilton performed a virtual reality string quartet, where four players played Coretet (a virtual instrument) together wearing VR glasses [8]. Though it pioneered how performers can perform together within VR

in a networked environment, it did not incorporate audiences as VR users.Audience participation is likely to become the next element for consideration.

Beyond this perspective, we can safely extend the social implications to archiving. If virtual live performances promote unity and presence, how can archivists preserve or develop this potentiality after the performance? Returning to the research above, we can spotlight a few directions. For example, archivists ought to pay continuous attention to body actions even in the archiving process because it elevates the sense of unity conceivably through somatic engagements and synchronized actions. If the body is the key to social experience in both performance and archiving, the archivists should consider incorporating his/her body in the process. Another highlight is the presence of others. On the one hand, the presence of others provides engagement in a real-world setting. Thus, VR would have to consider this social aspect seriously without blindly repeating the real-world experience. On the other hand, the archivists should determine if this social aspect is necessary for the archiving process: is the concert archived in a way that it would be open to the ensuing scrutiny of others? Should the archiving retain the social presence and sense of unity as in the live performance? If so, how can the archivists ensure a comparable level of social experience in the second and third......replay after the archiving? Should the social reactions in the first performance be recorded and incorporated into the archiving? These questions would be both technical and social to ponder.

Figure 5: Supporting the Sense of Unity between Remote Audiences in VR-Based Remote-Live Music Support System KSA2

Virtual Instruments

Performing in VR using virtual instruments shows another angle in studying archiving. Serafin, Stefania, et al. presented nine virtual instrument design principles, which are, 1. design for feedback and mapping between sound, visual, touch, and proprioception, 2. reduce latency. 3. prevent cybersickness, 4. use existing skills to extend the possibilities of VR instruments, 5. consider both natural and "magical"

interaction, 6. consider display ergonomics, 7. create a sense of presence, 8. represent the player's body, 9. make the experience social [21]. And the authors further analyzed several existing VR musical instruments. After the year of publication (2016), other creative VR musical instruments were developed. Annie Kelly and Kristofer Klipfel developed Audiovisual Playground (see Figure 6.), which follows most of the design principles and is a sequencer in virtual reality [12]. Coretet is another VR musical instrument developed by R. Hamilton, which implemented the core gestural and interaction modalities that generate musical sound in the violin, viola, and cello [8].

It would also be challenging but worthwhile to investigate further how to archive these instruments in correspondence to the nine principles above. In the actual process, the archiving of the instruments would entail "existing kills to extend the possibilities of VR instruments". Conceivably, one would first archive them utilizing the skills already applicable to the instruments. Still, one should not forget their differences from the virtual ones, including their ergonomics, latency, interactivity, and sense of presence. The archiving, in this fashion, should not be passive documentation of the virtual performance but an intimate engagement with all the nine principles above. In addition to following the digital mechanisms already embedded for archiving the music, the archivists should play an active role in considering "both natural and 'magical' interactions" and differentiating and curating both.

Figure 6: Audiovisual Playground

Applications of Live Performance

There are also some commercial applications for VR live performance. Considering their commodity nature, these applications would pay special attention to archiving. For example, Epic Games held the Astronomical Fortnite Concert in VR live in its game "Fortnite", attracting more than 12 million audiences to watch in 2020 (see Figure 7.). It combines motion capturing, live music performance, 3D modeling, animated live music video, and real-time interactions, which gives its audience a highly immersive and engaging VR experience of live music events. However, archiving is more critical for whoever missed out on the performance. It is always a challenge to archive the performance so that the end product would look as close to the live performance,

thus making immersiveness a requirement even after the actual happening. Mobilizing all the available technologies, the archiving would appear encompassing and dynamic, responding to a diversified pool of audiences separated by time and space. As a commodity, the archiving would also respond to market demands and make the process a customer-driven marathon. For example, what platforms and which shots should be considered? Are the advertisements being included, and how much of them? Should the social reactions, including the chat boxes and commentators, be incorporated? Although all these considerations can be easily realized in the metaverse by adopting a thorough strategy, market-driven archiving would require more accuracy and efficiency in targeting such an audience.

Figure 7: Fortnite Concert in VR

Possibilities

Beyond the onsite sound art of live performances, we could foresee those live performances will occur in the metaverse in the future. Another critical issue underlying these events is not the performing aspect but the archiving one because the metaverse indicates another possibility for the "live" and what it means to be "live". The action of archiving takes on the double meaning of performance as well. Accordingly, we should explore some current examples in the metaverse by comparing their methods and results.

Based on our review of current research and applications of sound art, we summarize some possibilities that would support the archiving of sound art in live performances from different perspectives.

Archiving onsite live performances in the metaverse

Recording is the most widely used method for archiving onsite live performances for the 2D screen, which utilizes video cameras and microphones as the primary devices for capturing the live event. However, since the metaverse is a 3D space, the way of archiving should be accordingly different, which challenges the dimensionality in traditional archiving. This issue brings us to the updated methods of recording.

Audio Rendering   Binaural rendering with ambisonics is currently widely used in the metaverse in the industry. However, recording ambisonic sounds in the real world require specific devices that can be used for real-world sound capturing and archiving in XR. In this way, we could let the audience hear the sound in sync with the position of the sound sources/performers at a live VR music event. This method

can provide a more vivid auditory experience that comprehensively simulates the real world. Besides recording using 3D devices, we can also employ post-production algorithms, particular software, or plugins in 3D game engines to remix the sounds recorded in mono/stereo into binaural representations. In that way, we could recover the original soundscape in the process of archiving.

Visualization Real-time volumetric video/motion capturing is commonly used for making 3D music videos, which could also be applied to live performances. It is fully applicable for a live sound event, though special equipment and room setup are required. Besides replicating the real-world live performance, 3D animation modeling can also be added to allow more creative maneuvering.

Archiving live performances which happen in the metaverse

Though there has been a paucity of applications for live performances in the metaverse, live performances in the metaverse can be delivered via 3D modeling of the stage/environment, motion capturing with 3D-modeled interactive instruments, real-time volumetric performance recording, and avatar audience.

Following the performances, archiving can be simultaneously exercised by 360-degree video capturing in XR and the delivered format is video. Alternatively, it can be completed programmatically by logging all the scenes and parameters. In this way, the archiving and performing are synthesized into one virtual act, which would also bring about technical and aesthetic values that would not be possible in the independent act of either.

Audio rendering and instrument Since it is a real-time event that happens in the metaverse, the sound is in its digital format originally. 3D audio with ambisonics can still be utilized and controlled more flexibly with programmable parameters. Building instruments in the metaverse can also be inventive with such flexibility, which can also be deployed and recycled in the archiving process.

Visualization Unlike recording scenes of onsite live performances, visualization is directly done in the metaverse, providing a more native space-driven archiving with higher replication. Music/audio visualization based on symbolic data or audio itself through audio analysis can be adapted to reflect the music changes visually. 3D modeling and animation can also provide a more immersive and creative experience. All the synchronistic elements will be reflected by the archiving as well.

Social Being present with others when attending a live performance elevates the sense of unity. For archiving, even if it's not live, it is critical to ask who would have access to the same archive, or how should it be while a large society as its potential audience is involved? We also expect that there will be future applications for performers and audiences in VR to answer the two questions further. Meanwhile, if the performance emphasizes a sense of unity, then the archiving should also consider this social element if other audiences will experience the event from the archive, not live.

Platform-based archiving

Design Design principles should be developed to build a platform that accommodates live performances. Lurk, T., Enge, J. presented the idea of FAIR (Findability, Accessibility, Interoperability, Reusability) for archiving cultural collections [14]. Due to the possible diversity and complexity of the live performance, to support a general use case, the metadata design should consider various factors. Some obvious common ones can be the artists/authors, the place, the time, and the content. Based on the discussion, if not only 3D videos are preserved, but also applications/audio rendering parameters/instruments/social data, it remains a question of what other metadata info should be included and how the design responds to this inclusion to make the platform user-friendly and aesthetically appealing.

Blockchain While considering the metaverse, we could easily form an association with the potential of other accompanying technologies, for example, the blockchain. A blockchain is a distributed ledger technology that stores securely linked blocks using cryptography [24]. A non-fungible token (NFT) is a unique digital identifier that cannot be copied, substituted, or subdivided in a blockchain, which is used to certify authenticity and ownership [25]. IPFS is a protocol, hypermedia, and file-sharing peer-to-peer network for storing and sharing data in a distributed file system[5]. Regarding the nature of sound art, such technology can be utilized to record and identify the authenticity and ownership of the performance when ownership increasingly becomes an issue in contemporary art and the market. VR music event tickets/social tokens can also be minted as NFTs to ensure their authenticity and be recorded as memory vouchers.Likewise, access to the archive can also utilize this apparatus to ensure the safety and sustainability of the process. The roles of the artist, archivists, and audiences would be further systematized while connected in a reliable way. Additionally, blockchain technology would also promote the circulation of the archive and track its network for market or research purposes. Yet there are also some challenges for utilizing this technology, e.g. limited storage, dependence on crypto currency value, etc.

Therapeutic and Mental Music or sound is sometimes believed to have unique mental or even therapeutic effects. However, some effective sounds are ephemeral or socially demanding. In such a situation, the virtual space would help customize the experience without compromising the demands of others, including those that would prefer different modes of social presence. The application of sound in the metaverse also has a psychiatric function and a safe and immersive space can only elaborate this faculty. Therapeutic approaches can be developed from this experience and help understand the human mentality in a virtual setting, serving as references for technological, psychological, and social research and applications. Throughout art history, the actual archives of photos, texts, and paintings have proved to bear enormous effects on the audience especially in treating many neurotic and mental diseases such as amnesia. Future

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[5]https://ipfs.tech/

archiving should also incorporate this therapeutic aspect into its programming and continue to develop this connection.

Accessibility for blind people   Through the "Be my eyes" app, volunteers can assist patients who are blind or visually handicapped by observing them on camera and directing them with sound. This demonstrates how significant the audial is among the community of the blind, which kindles a new way for sound archives to affect vulnerable communities.

Non-visual photography is a technique that enables blind people to take and perceive images through the height of sound. When the visually impaired get introduced to non-visual photography, they usually put their ears into the camera and take pictures based on the sounds and smells emitted by the subject to determine their orientation. Listening to sound to identify orientation is one of the more essential skills in non-visual photography. Sound training is also necessary for visually impaired people before taking non-visual photographs. For example, ping pong balls with sand and guides are suitable sound training devices, which can be used to train visually impaired people to distinguish their orientation through the difference of sound volume from different directions in the air. A visual field acquisition module, a central processor, and a 3D stereo sound module are all disclosed by Vivolight Medical Device Technology Co Ltd as an auditory-based device for communicating information about the environment to a visually impaired person[6]; visual field acquisition module is used to acquire stereo information about an obstacle surrounding a visually impaired person; The stereo information is transformed into planar information in the form of a two-dimensional matrix by the central processor, which then builds a 3D sound field signal based on the planar information and sends it to the 3D stereo module. In this signal, the position of the sound represents the orientation of the obstacle, and the sound's pitch, loudness, or timbre represents the distance from the obstacle. To help visually impaired people determine the orientation and proximity of nearby obstacles, the 3D stereo module's left and right ear speakers receive the 3D sound field signal from the central processor and output appropriate sound.

This technology has important ramifications for sound archiving. Based on the distance, height, and cue guiding of the sounds in the metaverse virtual environment, bodily impaired users can now transcend the limits of the visual and extend the possibility of the audial by taking photos through the ears, an action that would sound absurd before the advent of visual field acquisition module. It is no stretch to suggest that this technology can now enable the visually impaired to access the archiving process if vision has been rendered unnecessary. Accordingly, as in many other infrastructure designs, archivists should now consider the demands of the visually or other bodily impaired people to make sure that the archived experience also includes the vulnerable communities who share equal rights and needs to enjoy both the performance and archive.

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[6]https://patents.google.com/patent/CN204744865U/

Pros and Cons

The aforementioned examples demonstrate how archiving a live performance of sound art in a metaverse can circumvent some of the restrictions associated with actual locations. Still, there are also certain drawbacks associated with most new technologies. More importantly, traditional live performance can be easily incorporated into a metaverse and vice versa, which does not disfranchise the unique charm of the actual performance but proffers new hybridity and alternative to consider, which sometimes also give rise to progressive forms and changes.

In summary, the intriguing potential of the metaverse for delivering and archiving the sound art of live performance and more is as follows:

- Metaverse-archived performing arts can accurately and comprehensively capture the details of a performance.

- Moreover, Location doesn't matter. Audience members can participate and view the performance archive from any location using a headset or a computer screen if the user does not have a VR headset.

- As there will be differences in proximity to the stage in the physical space of the performance site, the perceived stage and sound effects will also be very different. The metaverse is not subject to these limitations in the digital archive. The user's digital twin can be teleported to any location in the virtual space to obtain a freer movement and greater agency in audiences.

- Metaverse archives can accommodate a huge volume of performances and provide enough space to accommodate the growing volume of archival content while retaining the original order and quality.

- Developments in the metaverse technology allow us to experience a fuller spectrum of physical interactions, such as pain [4], heat, and cold [16]. Further developments enable us to expand beyond vision and hearing and to integrate other sensory faculties, thus enhancing our bodily and mental engagements.

- New breakthroughs in sound technology can apply to archiving sound art in the metaverse. For example, the spatial audio technology released by apple 2022 for AirPods. It uses computational audio technology to enable adaptive equalization capabilities and support dynamic head tracking of sound. They are specially adapted to spatial audio in this virtual environment.

- Sound archiving in the metaverse offers additional potential for education, performing arts and therapy.

- In the metaverse, the action of archiving and performing could be synchronized and synthesized to express new aesthetics with higher efficiency. This shift could also redefine the real-time quality of music or sound performances, revealing an open boundary between the moments of singularity and plurality.

VR applications in archives also present challenges:

- Despite the popularity of digital devices, only a minority of people will have access to the content archived using a metaverse device in the initial stages. The rest of the

audience may be limited by the number of headsets. As a result, the spatial immersiveness in sound art may be compromised.

- It is unfriendly to special populations. For example, people with eye injuries or low vision could have difficulty accessing the currently visually-based metaverse.

- Building a metaverse space for archiving sound art is labor- and cost-intensive, especially at the beginning. It could also be more challenging if we hope to program the performing and archiving faculties together.

- The maintenance of archived data can be costly, and virtual archiving still takes materials seen in smartphones and laptops like silicons, which are not necessarily environmentally friendly.

- Copyright issues for archived sound art need to be resolved. Accordingly, the current legal framework must be expanded to accommodate the new situations affecting artistic authenticity and intellectual properties.

- How to realize the decentralization of users and developers relatively independent from the big-tech capitals would remain a social and conceptual challenge to be confronted.

In addition, we should not avoid the next question: Is a digital collection of real-time sound art performances that uses the metaverse as a platform genuinely immersive? Can experiencing sound art live and in person be more moving than experiencing it virtually through a metaverse? It is essential to understand that this metaverse archiving of sound art performances does not seek to replace live performances entirely. The metaverse is meant to sustain, preserve, and recycle information instead. Similarly, customers and artists will continue to enjoy the existence of vinyl records as the traditional medium for archiving sound and music. As insightfully put by Marshal McLuhan, "the medium is the message [18]" and sometimes archiving is not only a technical act but a multifaceted engagement with the individual and society.

What is certain is the creation of realistic virtual settings thanks to the advances in 3D reconstruction technology. According to specific authors and researchers, future policy decisions may use simulations as a testing ground. Therefore, future research will entail a more significant investigation of the interactive sensory experience of digital simulations and actual situations, along with the social considerations of these technologies.

Conclusions and Recommendations

Many artists and academics, including Ryuichi, have been able to experiment with more and more facets of sound and ambient space in general, thanks to the exciting growth of virtual technology. Following the historical trend toward immersiveness, virtual performances of sound art and other types offer the audience a unique experience that empowers both the audience and the performer to strike a better balance between physical vividness and virtual closeness, as well as between the pressures of social interaction and the

desire for personal freedom, presenting a range of intriguing possibilities. These initiatives will ignite the future of the creative and commercial arts, transforming the way aesthetic scholars think so that art will speak faster and better than words.

While the performing aspect of the virtual sound experience is often emphasized, the archiving aspect is equally crucial. The latest technology has also made it possible to recycle the performed resources better and efficiently, including sound and video art. They could be rewatched and re-experienced infinite times in theory. The key lies in how virtual technology replaces the conventional material-based archiving method. More examples clarify the advantages and challenges of this shift. Another question is valid: Who and what would decide what and how to document which works of art in which algorithm? Would such an archiving mechanism inevitably result in the democratization of art history, which was intended to be exclusively historical, temporary, and traceable only through the materials and eyes of certain people? What would art history look like if it was widely possible and acceptable to archive and access a whole art experience? We must carefully consider the aforementioned issues as we advance toward an increasingly virtual future that is both live and historical. This process also pertains to the epistemological efforts to synthesize technology and humanities in research and beyond because our reality is complicated by this entwining of various temporal-spatial locales and experiences which challenge artists and audiences alike in a way they were not accustomed to or prepared for.

The ultimate question falls back on the boundary between the virtual and real. Although it is widely accepted that this boundary has been increasingly ambiguous by experience, it still exists by nature for many. It also exists for some well-sought reasons: the audience would prefer the virtual under some circumstances, while the unique experience of watching a live concert of Micheal Jackson remains irreplaceable for many reasons. In such a "transcoding" blend, we would also wonder how the virtual performance and archiving would change the real or even help make the real more exciting and productive instead of competing with it. Many sound artists such as Mei Tei are already attempting to solve this challenge by engaging both the real and virtual, and by solving it, making live sound art a new form to bridge the two realms that are often unbridgeable but deeply connected. However, with new tools, has not art been a noble course to bridge the unfathomable throughout humanity?

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The VR Archive Project

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Abstract

Virtual Reality (VR) has become a popular new medium, but few realize that it has a very long history of development emerging out of early prototypes by research labs, artists, and inventors. Although the wave of immersive media projects that came about after 2014 has been recognized on a mainstream level, the majority of projects have been ignored by institutional archives. Archiving virtual reality has a particularly unique challenge because it is designed with interface, hardware, and software in mind. Some of the key challenges of the complex nature of this undertaking involve the intricate ecosystem of hardware and software and how the rapid obsolescence cycles continuously challenge efforts for conservation. As we enter a new era of virtual reality with metaverse platforms increasingly becoming more popular, continuing to build knowledge and community engagement in this field is crucial to deal with the immediate problem of caring for VR artworks. We know that archives are not neutral. They are a product of their culture, oftentimes the dominant culture. In this case, big tech is the gatekeeper when it comes to deciding what gets to be kept and what gets lost within the virtual reality community. As companies like Meta take further control of the industry, people will surely not get a clear understanding of the systems of oppression within the history of immersive media, let alone a virtual reality archive for future students to reference from the past.

The VR Archive Project is focused on developing concepts and prototypes for a VR Archive that restores and re-presents these VR experiences and visions. Similar in concept and function to a Film Archive or Internet Archive that collect, restore, and conserve a wide range of media, the objective here is to provide users an interactive, first-person, immersive experience of the VR medium throughout its evolution with links to a rich context of historical background and archival materials for deeper exploration.

Keywords

VirtualReality, Archive, ImmersiveMedia, Museum, Preservation, VRHistories

Introduction

According to the Library of Congress, 75% of silent movies before the 1930s are lost forever. [7] During the early 20th century, films were not considered to have much future value or lasting significance which lead to the majority of them not being properly archived or preserved. Most films were intentionally destroyed to avoid spending money on storage space and expensive upkeep of the materials. [7] By the time studios and institutions started to establish film archives, it was already too late for most of early cinema.

Preserving Virtual Reality

We are seeing a similar scenario take place with preserving interactive media projects as the majority of early games and VR experiences have been ignored by institutional archives. For the gaming industry, in particular, numerous community-driven collections and digital repositories have been established with little to no funding. [9] The Internet Archive's software library and the Video Game History Foundation have been preserving sizeable collections of MS-DOS and classic PC games. People can play these games through a browser-based emulator on their computers, although it can be buggy, this seems to be a viable method to preserve older games and keep them playable on a screen. Regardless, there are still thousands of indie games that are already lost as we depend on gaming enthusiasts and devotees to maintain and update these online libraries and emulation sites so they can continue to run on modern computer systems. The University of Michigan is one of few schools that has an established archive as part of the library that is dedicated to video games. The Computer and Video Game Archive has been a student-run effort where they focus on preserving games in a variety of formats so that the physical copies as well as the digital versions remain safe. [4] Although the archive is promising, there is still very little work being done to develop a formal archiving process for gaming on an institutional level. Diverse collections require different archiving methods which can be hard to achieve with such a lack of resources and financial support.

Similar to the gaming community, the wave of immersive media projects that came about after 2014 faces even bigger archiving issues. Preserving virtual reality has a particularly unique challenge because it is designed with interface, hardware, and software in mind. Unlike films and games that can easily be archived in formats that can be universally played on screens, the majority of virtual reality experiences are designed to run on very specific

hardware. Once a headset is no longer supported, the dedicated VR experiences also disappear with it, unless they are continuously updated to move to newer systems. Unfortunately, the majority of independent developers and creators do not have the resources, time, or budget to keep up with the constant turnover rate of new hardware. Not to mention the lack of infrastructure that prevents content creators from ensuring the longevity of titles that are not positioned with a financial gain. We can already see the shift happening in the Oculus store as the highly curated storefront is biased toward money-driving gaming titles, leaving little room for narrative experiences. Most narrative work on the store comes from established immersive studios like Novelab, Felix & Paul, and the late Oculus Story Studio. Although the works from these studios have produced award-winning content that made a considerable impact on immersive storytelling, the lack of access to smaller titles is causing a number of hidden gems to be left behind to fade with older machines. Steam is more promising when it comes to the accessibility of older VR games and experiences as they are 'safely' preserved in their servers and still downloadable to be played on past headsets. They are also hardware agnostic since they support content across multiple devices and the storefront is friendlier for independent developers as the onboarding process to upload interactive projects is much easier compared to the Oculus Store. In any case, the experiences can only be playable through Steam, forcing users to fully depend on their platform. There are some exceptions where you don't need Steam to play but you will still need it to reinstall or update the experiences. With these examples, one has to consider how the culture of silicon valley and tech companies play a major role in controlling what gets to be preserved and what doesn't.

Considering how rapidly the medium has evolved, it is very difficult to identify a standard of best practices for archiving VR. The competition between tech giants have ultimately shaped the history of virtual reality as the platforms people could create experiences for shifted continuously through the years. Google and Samsung used to lead mobile headsets with the Daydream and Gear VR, funding all kinds of creator initiatives and creative projects only to discontinue the hardware after a few years. Google even spearheaded creator labs for Youtubers around the world to teach immersive filmmaking to promote VR adoption, yet this was swiftly abandoned by the end of 2019. One of the few Google platforms that remain are for 360° and 180° films on Youtube which is still considered to have the largest collection of immersive films. One has to keep in mind though that this repository is at the total mercy of a corporation that has shown little value to its impact on the immersive media community. Archiving 360° works are easier since they tend to be in similar file formats as video which makes them viewable via any screen or a simple cardboard headset. Although the Google Cardboard was only officially discontinued in 2021, it's still used among some 360° filmmakers as a pre-vis tool and a low-cost way of showing immersive work to people. Google first announced it around 2014 as a VR platform that turned your smartphone into a 3D viewer with a

foldable cardboard box and stereoscopic lenses. In order to encourage creators and developers to start making more content in VR, Google also released an SDK as well as instructions on how to build cardboard viewers from scratch. This played a significant role in making VR accessible to the general public, as all kinds of mobile apps and 360° films started being developed after 2014. A crucial moment in VR history is when the New York Times sent out Cardboards with all home newspaper deliveries in 2015 to feature their NYT VR app that focused on immersive journalism. This was followed by all kinds of media outlets, music festivals, and even universities using the Google Cardboard as a cheap way of creating immersive experiences mostly for marketing purposes. Eventually, Google announced its first headset, Daydream Viewer, as Cardboard's successor. This was not widely adopted and quickly discontinued as interest in VR had started to slow down and 6DOF headsets started to become the norm. Regardless, the Cardboards have become little relics of memories and Google's once ambitious efforts in the immersive media space. It is a notable example of how mobile VR had a shortlived but significant position when looking into the history of virtual reality within the 21st century. The majority of the experiences created specifically for mobile headsets still remain in a murky space of being lost forever. The most unfortunate aspect of this is the amount of VR experiences that were created for some of these discontinued headsets that no longer have a home or a way to archive them since they were tailor-made to those platforms. This is why preserving the hardware as much as the experience itself is key when it comes to archiving virtual reality projects. The afterlife of these platforms is also in an ambiguous space as some become open source like Google's VR painting app, Tilt Brush, while some companies like Samsung shut down and terminate everything. If these kinds of issues are not considered while the products and creators are still relatively popular, what will happen if we start the archival process for virtual reality when everything is nearly forgotten in the next few years? Similar to the early days of cinema, people see VR less as an art form and more as throw-away entertainment. By the time we start studying these media and appreciating their historic and cultural significance, some of the most important works as well as the failed ones will be long gone, and restoring them will become an immense undertaking.

Another thing to consider about virtual reality is the fact that it is closely engaged with other industries and communities like film, gaming, and the art world. The responsibility of archiving immersive content goes across these industries and the respective institutions that tend to decide what gets to be preserved and what doesn't. As we see an increasing amount of artists creating work within immersive media, major art museums and cultural heritage institutions are becoming more inclined to consider how these works will be archived for the future. One of the biggest challenges for VR, like many of the new mediums that came before it, is achieving full acceptance as an art form. With the art market, in particular, there is resistance against buying and preserving immersive works since

collectors are hesitant about the longevity of the medium. We have seen this happen time and time again within art history as collectors have also been reluctant to accept video and photography as an art form worth saving in art institutions. In the decades that followed the invention of photography, there was constant discussion on whether or not it could be regarded as art. There seems to be a continuous comparison of mechanical or digital mediums in contrast with traditional artistic forms like painting and sculpture. The value of the art itself seems to be deeply connected to its medium as it could be argued that the art world to this day still seems to care more for work that is created with the "human hand" instead of a digital device. It is almost as if new media could not equal in creativeness to traditional forms of fine art like drawing or painting. Eventually, the photographic community did become successful in legitimizing photography as an art form, calling attention to not the tools the art is created with but to its capability for artistic expression. A French naturalist, Louis Figuier, also had an interesting remark on photography and fine arts: "Until now, the artist has had the brush, the pencil, and the burin; now, in addition, he has the photographic lens". The lens is an instrument like the pencil and the brush, and photography is a process like engraving and drawing, for what makes an artist is not the process but the feeling." [2] Thinking of immersive media within this context of art history is important when we are still in the early stages of establishing virtual reality as an art form. Unfortunately, the salability of it within the art market does contribute to how museums and institutions will invest in preserving the medium as well. Focusing our values on the durability of the medium instead of its artistic expression also overshadows the justifications of why these artworks must be protected. Virtual reality, like all forms of art and media, is a reflection of the time and culture in which it was developed. So it can provide valuable insights into the social, political, and cultural events of the past and present. Archiving these works will help to preserve this cultural heritage and ensure that it remains accessible to future generations.

Making an argument as to why virtual reality must be considered an art form seems almost obvious and there have been a number of redundant observations from artists and curators within the space who have been fighting to get the medium recognized. These observations usually go along the lines of how VR allows artists to create immersive experiences that can be used to tell stories, create emotions, and engage audiences in ways that other mediums cannot. Unlike traditional forms of art, such as painting or sculpture, virtual reality allows artists to create an entire world for the viewer to explore and interact with. This allows for a level of immersion and engagement that is unique to this medium. Additionally, virtual reality can be used to create interactive experiences that allow the viewer to influence and shape the story, making it a truly unique and dynamic art form.

Perhaps, rather than justifying the artistic value of VR, we must also consider the actual work it takes to create guidelines and best practices to preserve the artworks.

"Every artist, especially those who want to create work that feels genuinely new, must know the history of their art form: you can't push your medium forward if you don't know where it's been." [1]

The preservation of new media art has always been a challenge because of its ephemeral characteristics, whether it is a video installation, sound-based works, or net art. A new understanding of archiving is required to accommodate the rapid development of technology and to preserve these artworks which tend to rely on outdated hardware and software. Net Art in particular has an interesting approach to preservation as the conservation efforts of institutions are mostly built around emulation and restoration. Rhizome's Net Art Anthology is an example that presents a curated collection of early net art that has been restored to be viewable on modern-day browsers. The Internet Archive is also leading the way with tools for web archiving, such as the Wayback Machine. However, the preservation of a single version of a website may not capture the living aspect of the virtual environment where the project exists. For a full historical context of the artwork, it is just as crucial to document the project's various stages and environments through time. Some other general approaches to archiving new media art also include the storage of software and hardware over time, migrating work to updated systems, and documentation. Yet, documentation can also fail to revive works like video installations since images or footage simply lack the vitality of a live experience. In general, there is no magic solution for preserving new media art, and the best preservation plan would be determined in cooperation with the artist depending on the artwork's specific characteristics. The preservation of each work requires consideration of hardware and software components, as well as the artist's relationship and approach to the technology used. The same concepts can apply to preserving VR, for example, by storing copies of the project in its various states in different headsets and game engines in order to illustrate the artist's process in the context of what was available at the time of the project's creation. In any case, the successful archiving of new media artworks as well as VR largely depends on the standardization of technology and preservation strategies.

Tate's Time-based Media Conservation team has been working on a fantastic research project that has been cultivating knowledge in this area. Some of the key challenges and risks they have identified bring clarity to the complex nature of this undertaking, like the intricate ecosystem of hardware and software and how the rapid obsolescence cycles continuously challenge efforts for conservation. The outcome of the project which is detailed in the "Preserving Virtual Reality Artworks Report", presents a high-level approach to this issue and breaks down the inherent traits and reliances of the technology to recommend how to best archive the process of production and final content of the artworks. The report studies the interlinked components of immersive media works and how preserving each element in the production process like

the project files, assets, and source code will better support the longevity of the medium. [5] Apart from this, the report also recommends creating multiple builds for different platforms and VR hardware as it highlights the issue of the lack of standardization in VR development which plays a critical role when it comes to migrating the works in the future. Open-source standards for file formats and software seem to be a viable way of moving forward although it is not something that is likely to be adopted by an industry that has been focusing on and growing its investment in proprietary software.

Project Overview

In some instances, it is possible to access research papers and other documentation about virtual reality projects which can give a general sense of their functions. But what if you could virtually visit those early labs to experience what those prototypes were really like and learn more about what inspired those pioneering efforts? This project is focused on developing concepts and prototypes for a VR Museum and Archive that restores and re-presents these seminal VR devices and visions. Similar in concept and function to a Film Archive or Internet Archive that collect, restore, and conserve a wide range of media, the objective here is to provide users an interactive, first person, immersive experience of the VR medium throughout its evolution with links to a rich context of historical background and archival materials for deeper exploration.

Approach:
The first phase of this project has focused on the development of simple proof of concept simulations of the first efforts to develop VR technologies. These immersive experiences include:

• The Sensorama device developed in the late 1950's by Mort Heilig which provided a multisensory, immersive cinema experience.
• The "Sword of Damocles" head-mounted display project led by Ivan Sutherland in the late 1960's which prototyped many of the computational and display technologies still used in contemporary VR and AR media.

The simulations of these projects are developed in a Unity based 3D computer graphics environment and displayed in contemporary VR devices such as the HTC Vive and the Meta Quest. The assets for 3D objects in the simulations such as Sutherland's HMD and the Sensorama device are captured with high-resolution photogrammetric scanning technologies and imported into the Unity environment. Current prototypes of these experiences allow users to enter or put on virtual models of the early devices, see the original content that was developed, and interact with device components. Next steps include guided descriptions of the devices, annotations of the technology components, the addition of other seminal VR projects, and the development of a virtual architecture for housing multiple experiences.

The development team for this project consists of USC faculty, staff, and students from the School of Cinematic Arts (SCA) along with The USC Mobile & Environmental Media Lab. The team is working in collaboration with SCA's HMH Foundation Moving Image Archive.

Conclusion

Ultimately, in order to establish best practices for preservation and support the futurity of these studies, there needs to be a collaboration between artists, institutions, and above all the technology companies that the medium so heavily relies on. As we enter a new era of virtual reality with metaverse platforms increasingly becoming more popular, continuing to build knowledge and community engagement in this field is crucial to deal with the immediate problem of caring for VR artworks. It is also important to consider the potential long-term value of archiving virtual reality content, both for researchers and for the general public. This can help to justify the investment of time and resources in preserving this unique and valuable medium. We know that archives are not neutral. They are a product of their culture, oftentimes the dominant culture. In this case, big tech is the gatekeeper when it comes to deciding what gets to be kept and what gets lost within the virtual reality community. As companies like Meta take further control of the industry, people will surely not get a clear understanding of the systems of oppression within the history of immersive media, let alone a virtual reality archive for future students to reference from the past.

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An Immersive Multi-Screen VR System for Museum Archive Browsing in the age of Metaverse

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Abstract

The current pandemic is forcing us to move many of our activities online. Digital technologies, such as augmented reality (AR) and virtual reality (VR), are becoming the latest examples of the trend toward digital excursions in the metaverse. Their ubiquitous impact on our lives requires us to rethink how we view and collect information. With the advent of the post-pop era, virtual reality was previously developed by art museums and institutions, not as a substitute for offline (offline) tours but as an enabler and aid. And VR systems can also enable information retrieval, allowing users to access and navigate information in an immersive virtual environment quickly. In this paper, we propose a multi-screen information retrieval branching system that enables users to distinguish between priority and secondary information in VR environments by the screen's distance—improving the efficiency of information acquisition.

Keywords

Museum archiving, VR, interactive system, branching, metaverse

Introduction

Whether we use a museum's webpage to review previous exhibitions or to flip through information as archival content for a collection, the process requires a lot of access to information. Currently, the way information is presented is still limited by media access. For example, web pages are primarily arranged in tabbed form as a list, which does not allow users to organize information well with each other. The severity of these problems becomes more pronounced as instant online information access is constantly updated. While information organization tools like Miro[1] are now available to create associations and hierarchies and custom edits, they are still limited to the two-dimensional space of the computer screen (see Figure 1). By introducing a third dimension, immersive technologies, VR, and metaverse help us to present this information in a hybrid, three-dimensional way, making it more diverse and beautiful. At the same time, the static two-dimensional format of the computer screen severely limits the exploration of new topics on the Web. Users need to use external tools to

organize and connect new concepts to provide 3D environments, and browsers with existing VR devices cannot take advantage of 3D space.

This paper presents an interactive system for VR multi-
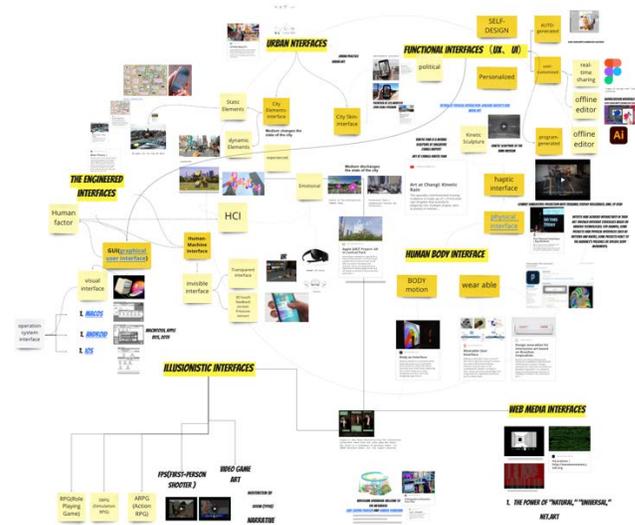
Figure 1.This is an example of information organization in 2d web view in Miro. © Copyright by Author.

screen museum archival information browsing in a metaverse. The system performs keyword-based information retrieval and facilitates audience manipulation, organization, and linking of multiple content sources in an immersive environment. The system relies on a custom catalog to guide users through archival information browsing, allowing for the categorization and custom combination of primary and secondary information in a virtual reality environment. It addresses the need for personalization and browsing categories for web-based information access in museum archival information browsing. We applied the system to the browsing of museum archival information. It can also be helpful for

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[1] Miro, The Visual Collaboration Platform: https://miro.com

many information browsing scenarios, e.g., tour planning and exhibition information queries. We also developed three design guidelines for future VR information browsing systems through semi-structure interviews, focusing on display, interaction, and human design. This study gives a critical perspective on interacting with information interfaces in VR environments in a future metaverse environment. It illustrates a macro view of our multi-screen browsing system that helps users track information in multiple formats, making viewing information more efficient.

Our contribution can be summarized in the following points.

- In a virtual environment, we introduced a multi-screen browsing system. With the help of this approach, we are able to organize our browsing of stored data according to how close the virtual screens are to us.

- A multi-screen virtual reality system was created for browsing museum archives (see Figure 2). This system is a multi-screen, interactive way to browse museum archives while immersed in virtual reality.

- To enable immersive exploration of the museum archives in a virtual setting, we suggested interactive features. On the basis of user needs, we also created functions to direct the interactive features in the VR system.

Formative Studies

During the Newcastle pneumonia epidemic, approximately 85,000 museums worldwide were forced to close temporarily, representing 90.9% of all museums. 12.8% of museums worldwide, equivalent to 1 in 8, will close permanently. Another 19.2% of museums are still determining if they will be able to sustain themselves in the future [1]. Many museums are trying to stay afloat with VR and online exhibitions [2].

While giving museums and exhibitions a degree of attention, these online exhibitions make it difficult for users to return to view them for the same exhibition. Meanwhile, museums' online archives are gaining attention, and almost every major museum has its online archive for users to browse. But the way to browse online archives today is still in the form of text, images, or videos. Some museums have used Google Arts & Culture[2] to reconstruct physical exhibitions and spaces in 3D, such as the Guggenheim Museum in New York, The Museum of Fine Arts in Houston, and the Asian Art Museum in Fukuoka.

But the way to browse online archives today is still limited to the web and very few VR exhibitions. In today's world of VR headsets, it is clear that the browsers that come with VR devices have some technical limitations, such as overly sensitive controllers, complex virtual keyboard input, and dizziness. It is a challenge for users to efficiently browse the museum's archives and access related information quickly.

Following our initial study on the existing theories related to interactive user interfaces, archive, information retrieval, we aim to establish the exact expectations, needs, and constraints of the diverse stakeholders of an immersive multi-Screen VR system for museum archive browsing. We thus conduct questionnaires and semi-structured interviews with 15 participants, including artists (A1, A2, A3), curators (C1, C2, C3), museum archive experts (M1, M2, M3), and general audience (G1, G2, G3, G4, G5, G6). The questionnaires and interview scripts focus on the topics of museum archive methods, VR archives and information browsing, and aim to address the current shortcomings of such methods while encouraging the participants to develop how such systems could be improved.

Interaction Functions

Interaction with virtual space: While VR archiving is becoming increasingly popular. For instance, the National Museum of Modern and Contemporary Art Seoul. The museum has a VR archive as a category within the online presentation of the museum's collection. Today's web is so advanced that most museums have their websites and archiving systems, and information about all the exhibits in their collections is built into that page. This is the more popular way of displaying. We presuppose that this system will be associated with a web platform to implement a metaverse virtual environment with a mixed-reality interface and interactive approach.

Multiple screens can be interacted with within the metaverse space, pulling in and out virtual screens that display primary and secondary information. Project the archived content displayed on the virtual screens into the area in front of the user and allow the user to fast forward or backward and slide to any progress using gesture interactions such as swiping left and right to navigate in an immersive manner (see Figure 3).

Interaction with archived content: Users can perform the most basic functions for online archived content, including content browsing, downloading, commenting, and zooming in and out. Users can interact with the exhibits in the virtual archive through gestures. For example, they zoom their avatar into a painting and use a brush to leave a mark on a
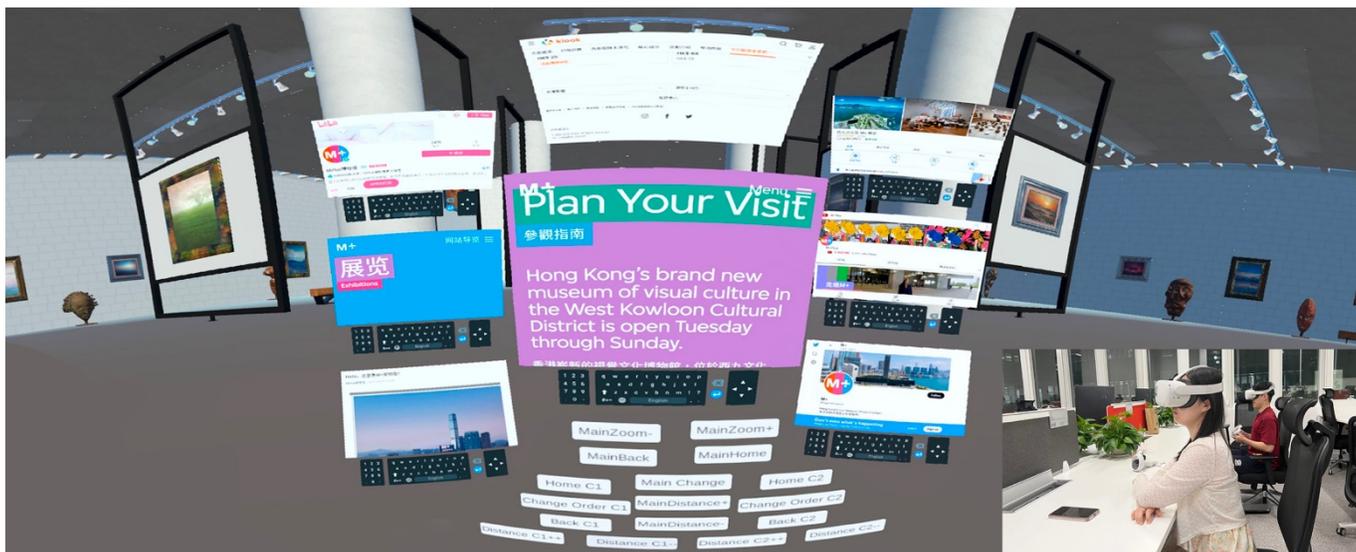
Figure 2. Two users using the Multi-Screen VR System for Museum Archive Browsing. ©Copyright by Author.

sculpture. Of course, the administrator can choose to clean up the traces left by the users periodically.

System for searching and browsing archived databases: When the user selects this feature to begin, a basic search bar and typing keyboard interface will appear. When a search target is entered, the system will display a preview of the pages sorted according to how the files are stored, such as web content or content in archived databases in different file formats. Users can search for any exhibit held in the museum's archives, such as sculptures with 3d models and interactive installations, according to their needs. This is the equivalent of the search tool found in any computer today, resulting in a unified search engine tool that integrates multiple formats and task goals. Crucially, users can open multiple pages simultaneously for browsing and interaction, dragging pages as needed, hovering them where the user wants them, or prioritizing the reality of various interfaces in a semicircle around the user's face. Of course, such interactive features require further consideration of user preferences, recommendation systems, etc.

In addition to the above features, users can achieve multi-user asynchronous communication by leaving a tour trail and commenting on archived artwork, which can appear in a novel 3D or standard 2D form with dynamic effects on the mixed reality interface.

VR system and a multi-screen browsing experience. It can be used for both main and secondary browsing of archived museum content (screen size and distance), and it can also be used to get basic data. We first carried out a rigorous study to assess the drawbacks of the current default VR web browser before beginning the overall design. This study demonstrated that VR's built-in system browser presents users with numerous interaction challenges. For instance, the virtual browser's screen's clarity and input method. We created and developed an Immersive Multi-Screen VR System for Museum Archive Browsing based on the findings of this investigation. Users can explore, retrieve, and organize data from museum archives in this virtual setting by using the practically unlimited 3D space. To evoke a sense of familiarity and immersion in the location, we created a virtual museum scene for the scenario design.

We intend to look into the integrated design of the hybrid interface in the future, taking into account the multimedia system, recommender system, and human-computer interaction. engagement with computers and multimedia

Conclusion and Future Works

In this study, we construct and assess a system to investigate the viability of preserving information surfing in VR with multiple screens. By creating and analyzing a

technologies. Our ongoing study

Fig.3.System Architecture.

will concentrate on developing a meta-spatial museum that combines a physical museum with a digital. Our immersive multi-screen browsing system prototype is intended to inspire other researchers and artists to connect digital and real-world environments and to further investigate the usage of the metaverse for information retrieval and browsing.
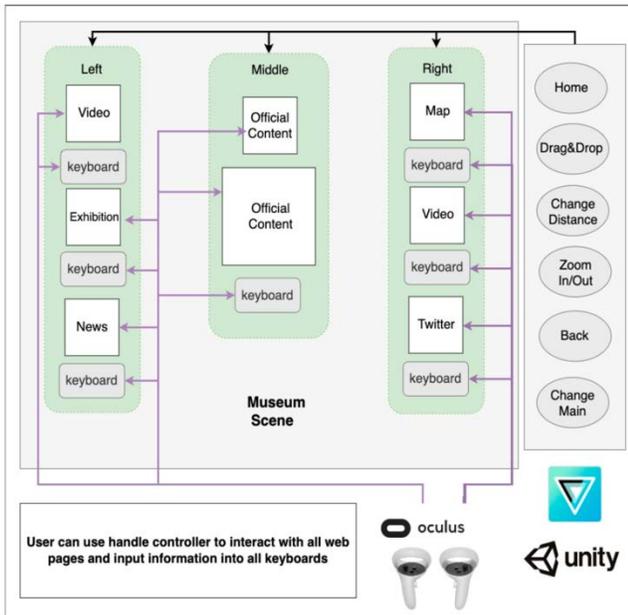
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Ze GAO is an interdisciplinary artist, curator, and media art researcher based in New York and Hong Kong. The Extended Reality and Immersive Media (XRIM) Lab at HKUST and the Tongji University-MIT Shanghai Urban Science Laboratory are where he works as an artist and researcher. After studying multidisciplinary fine arts at the Maryland Institute College of Art, he received an MFA from the School of Visual Arts in New York. His research spans a variety of methods and interests, including artificial intelligence, human-computer interaction, museum study, game design, and VR/AR. He has a background in both image science and art. His work has been published primarily in Emerging Technologies, Gamification, and Media Art conferences and journals like ACM Multimedia, ACM WWW, ACM ICMI, ACM SIGGRAPH, CHI-PLAY, IEEE, and ISEA.

Zheng WANG

Zheng WANG is a curator, scholar, and writer of critical, historical, and creative content. Born in Guilin in 1996 to an Iu-Mien ethnic minority family, Wang grew up in Wuhan, studied in the US for his undergrad and graduate degrees, and currently lives in Singapore. He is a Ph.D. student at the School of Art, Design, and Media, specializing in contemporary art history and theory at Nanyang Technological University, Singapore. In 2020, he graduated from Rice University with a bachelor's degree, double-majoring in Art History and Studio Art. In 2022, he received a master's in Art Criticism specializing in Aesthetics and Politics from the California Institute of the Arts in Los Angeles. Academically and artistically, Wang is passionate about engaging in comparative and transcultural criticism and curatorial work. He is also a practicing artist in installation and texts.

- Papers: Connecting Archives-

Global Archiving Network:
The 2nd Summit Case Study Report

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Abstract

One of the primary functions of an archive is to act as a repository to store essential documents and records throughout history; consequently, these stored archival materials can help us re-imagine a collective memory of the past. With rapid changes in the dissemination of information in recent years, the conventional ways of archiving may not be able to capture all the essential records of our time. This is especially concerning in regard to new media art archiving. Many recently created important new media artworks have been disappearing without being archived. If this issue is not addressed, we may lose a significant part of our cultural heritage. To respond to the issue, archives worldwide have attempted to approach the problem collectively. This paper is a report on a proposed study presented at the Second Summit on New Media Art Archiving at ISEA2022, taking the Summit as a case study to review the progress made in connecting archives worldwide.

Keywords

Global archiving network; Summit on New Media Art Archiving; archive; new media art; digital culture heritage; ISEA Archives; Liverpool Declaration

Introduction

New media art is a contemporary-art category in which the media itself is very technology-dependent. Artists often incorporate emerging technologies in their artworks, constantly redefining and expanding the category. Unlike many more static traditional art media, this evolving genre of art faces a severe problem: many recently created artworks can no longer be exhibited and may disappear without a trace due to technology obsolescence, lack of data, and insufficient documentation. As technology changes, the challenge of archiving new media artworks has become more critical. If this issue is not addressed, we may lose a significant part of our history, cultural heritage, and the arts of our time.

As a result, discussions on this topic have become more frequent at different levels worldwide, ranging from individual artists, organizations, and companies to major institutions. Nevertheless, many related discussions are scattered without follow-up. In many cases, new media art archives are limited with resources and face their archival challenges independently while archiving new media art collections. There have been insufficient communication channels to allow archives to collaborate, share data, and learn from each other, avoiding duplicate efforts in preserving this ever-changing medium.

Since 2020, the annual Summit on New Media Art has become one of the more organized and focused group conferences for related topics. The Summit provides a platform & communication channel to engage and connect like-minded stakeholders in the new media art archiving community for sharing knowledge, exchanging ideas, networking, and seeking collective strategies to tackle mutual archival challenges.

The Summit series has gained support from the new media art archiving community, with a growing number of international archive partners. Progressively, as of today, a core group has been formed by the partners, including the ISEA Archives, the Archive of Digital Art (ADA), the archive for the Histories of Media Art, the Ars Electronica archive, the ZKM archives, the SIGGRAPH History Archive, the Electronic Language International Festival (FILE) archives, and the MEMODUCT posthuman archive. [1] As the Summit gains broader worldwide involvement, an emerging global archiving network on new media art is gradually taking shape.

This paper intends to investigate the Summit on New Media Art, specifically taking the Second Summit last year at ISEA2022 Barcelona, as a case study for the emerging global archiving network phenomenon. The goals of the case study are: 1) to identify the current status of the emerging archiving network, 2) to analyze the various problems and solutions, and 3) to report the findings to the archiving community as a contribution.

A Brief of the Summit

The Origin of the Summit

The Summit series has been predominantly organized by the ISEA Archives with the other archive partners, with no financial support and limited resources. The Summit series has taken place at multiple ISEA Symposium editions, beginning as roundtable discussions and eventually evolving into a mini-conference series.

The International Symposium on Electronic Art (ISEA) is an annual nomadic international art, science, and technology gathering with four decades of history, including papers, artistic creations, presentations, exhibitions, performances, concerts, workshops, and cultural events. Each

symposium takes place in a different country every year. One of the original aims of the founding of ISEA was to start a network of organisations interested in the relationship between art and science. With ISEA's nomadic nature and founding vision, ISEA Archives has embarked on the discussion of connecting archives with a global perspective.

Began with Two Roundtable Discussions

The discussion began with two roundtable sections during two consecutive ISEA Symposium years, the ISEA2018 in Durban, South Africa [2] and ISEA2019 in Gwangju, South Korea (see figure 1) [3]. The discussion is built based on the Liverpool Declaration [4]. Both roundtable sessions gained tremendous support and, as a result, became a foundation for the First Summit on New Media Art Archiving in the next year at ISEA2020.

Figure 1. Roundtable Discussion at ISEA2019 Gwangju

The Liverpool Declaration

The Liverpool Declaration, also known as the Media Art Needs Global Networked Organisation & Support- International Declaration, was initiated in 2011 [5]. The Declaration was well supported by stakeholders in the new media art field. It was signed by over 500 members from governments, universities, research institutions, researchers, artists, academics, funding agencies, foundations, libraries, museums, archives, learned societies, and professional associations. It has outlined the objectives of establishing a global archive research infrastructure with two main goals [4]:

1. Establish a sustainable-global funding structure
2. Support an international association for shared data

And the Declaration suggests an action plan to promote collaboration for the alliance through [4]:

A. Recognize and build upon existing knowledge and resources
B. Provide and foster channels of communication
C. Enable data sharing among the stakeholders
D. Encourage peer exchange and address new challenges

E. Develop tools and methodology for the documentation and preservation
F. Provide inspiration and resources for curators, artists, scholars, educators, and audiences
G. Support new media art archiving related networks, conference series, repositories, and publications
H. Promote new ways of understanding media art, science, technology, and its histories

First Summit at ISEA2020 (Online)

The one-day First Summit on New Media Art Archiving was held online during ISEA2020 from Montreal, Canada (see figure 2) [6]. Due to the Covid pandemic, the First Summit deviated from its initial planning of an in-person conference and became an online event. The First Summit was coordinated by representatives of the ISEA Archives, the Archive of Digital Art, the Ars Electronica Archive, and the SIGGRAPH History Archive. The Summit opened with a keynote speech by Professor Oliver Grau, initiator of the Liverpool Declaration. Twelve papers from nine countries covered international support, project infrastructures, new strategies, archiving technologies, documentation of artifacts, collections, preservation, and new approaches to archiving new media art. And four presentations were given by the coordinating archives. Followed by three breakout sessions: I)" Connecting New Media Art Archives," II) "Creating Ties to Museums," and III) "Funding for New Media Art Archives."

The First Summit concluded with a moderated plenary discussion that outlined concrete proposals and a roadmap working toward the goals of the Declaration. The Processings for the First Summit were included in the official ISEA2022 symposium Processings [7].

The First Summit triggered interest from many archives, and as a result, a core archive group was formed, with the addition of the FILE Festival Archive, to hold more focused and structured discussions.

Consequently, after the discussions at the First Summit, another initiative, the Connecting New Media Art Archives Project [8], also embarked with the interested archive partners. The project is ongoing and intends to connect databases between different institutions worldwide, enabling sharing of information and cross-institutional research for new media art.

Figure 2. First Summit on New Media Art Archiving online at ISEA2020 Montreal

Second Summit at ISEA2022 (Hybrid)

The Second Summit on New Media Art Archiving was held during the two days preceding ISEA2022 in Barcelona, Spain, at the Barcelona Museum of Contemporary Art (MACBA) (see figure 3) [9]. The Barcelona Symposium edition was postponed for a year with many uncertainties due to the Covid pandemic. The Second Summit is in a live-streaming hybrid conference format with in-person on-site and remote online participants. A total of fifty-two sessions, with thirty paper presentations, four roundtable discussions, two panels, and sixteen archive presentations, were scheduled in the two-day Summit programme. In addition, a juried art exhibition for artworks inspired by the theme of archiving also took place during the Summit [10], bringing artists' views to the discussion of archiving. Presenters from fifteen different countries presented either in-person or remotely, covering topics on [9]:

I)   Museums and the integration of Digital Arts
II) Communication and Coordination among Archivists
III) Cooperation among Museums and New Media Art Archives
IV) Funding Initiatives
V)   Developing and Maintaining Physical Archives
VI) New Directions in Online Archiving
VII) New Technologies for Archiving
VIII) Ethics in Archiving

This also included archives presentations and artist talks. All Second Summit papers were also included in the official ISEA2022 Symposium Proceedings. [11]

Figure 3. The second Summit on New Media Art Archiving in the Modern Art Museum Barcelona (MACBA) at ISEA2022.

During the Second Summit, a dedicated presentation section for interconnecting archives was organized to continue the discussion on connecting new media art archives worldwide. The section consisted of a roundtable discussion titled "Towards a Global Distributed Network of New Media Art Archives" [12], a presentation titled "Interconnecting Archives: Paving a Path Forward" [13], and a research proposal presentation related to this paper titled "Global Archiving Network: A Case Study on the Second Summit on New Media Art Archiving." [14]

Global Archiving Network, Case Study: Second Summit on New Media Art Archiving

This study intends to take the Second Summit on New Media Art Archiving at ISEA2022 as a case study to investigate the phenomenon of new media art archives establishing worldwide connections. The Summit series is an ideal selection for the study because the Summit series itself is an outcome of an initiative collaborated by archives in the emerging network.

Data Collection

The case study consists of data collection mainly through observations, literature reviews, and participants' data collection with surveys and interviews. Thirty-one Second Summit participants responded to an anonymized online survey. In addition, more data were collected from the Summit organizing committee members and the Summit archive partner representatives through in-depth interviews or surveys. Although the data collected may not imply the best practice in developing a global archiving network, the study result suggests a summarized opinion collected from a representative targeted demographic in new media art archiving within the case study bound.

Researcher's Involvement in the Summit

The researcher of this case study has multiple roles with the Summit as a researcher of the study, archivist and co-director for the ISEA Archives, and member of the organizing committee for the Second Summit. To minimize bias and differentiate the data collected from this study's participants and the researcher's view, the researcher only includes his ethnographic opinion in this paper's later sessions at the recommendation and conclusion.

Second Summit Participants

The collected data shows diversity in the Second Summit participants with a common interest in new media art archiving, including artists, entrepreneurs, scientists, curators, academics, historians, journalists, art administrators, writers, archivists, and researchers from various affiliations in fifteen different countries. Participants are eager to share knowledge, exchange ideas, network, and create collaborative approaches to solving the complex problems of preserving the history of new media art.

Challenges in New Media Art Archiving

Since this global archiving network research is the first case study on the Summit, the study also provides an opportunity to verify if the Summit has addressed the critical concerns of the various shareholders in the community and if any

crucial topics or challenges are not being covered. Therefore, as a reference, for assisting in decisions making on connecting archives and prioritizing collaborative projects in the future.

The survey results show that the Summit has covered the majority of topics concerning the Summit participants. Although, in many cases, problems faced in new media art archiving are unique case-by-case scenarios; however, many of the common challenges encountered include:

1) The technical challenge of technology having become obsolete
2) Lacking documentation for individual artworks and proper overall standards for documenting the ever-changing new media art forms
3) Public awareness of this art form as the art of our time and its importance
4) Lacking a sustainable funding infrastructure for the new media artwork conservation and archives
5) Institution systems itself is not closely caught up with the digital age, and their long-term vision for cultural preservation and curatorial planning does not include new media artworks

The above list is shown in sequential order based on the relevance to the survey participants in their archival practices. The scores are rated relatively evenly by the participants. But 1) technical obsolescence and 2) lack of documentation & overall standards are at the top of the list with a higher tied score. Anonymized survey participants have also expressed subsequent concerns because of these challenges related to decision-making on selecting the appropriate archival system, methodology, tool, etc. Many have stated the need for up-to-date guidelines to help decide appropriate solutions. Or, ideally, a live online communication platform/forum where archivists can share the most recent experiences on successes and failures in the different areas, predominantly for lesson learning and avoiding duplicate efforts in similarly encountered situations.

Most survey participants also want standards and protocols for new media art archiving and preservation. However, due to the ever-changing nature of new media art, it is unusual to have a one size fits all solution, which makes developing standards challenging. Based on some survey suggestions, standards development may approach from the notion as a "boundary object," in which the standards should be both plastic enough to adapt to specific needs and constraints yet robust enough to maintain a common use. Moreover, a holistic view should be considered for including online, digital, and physical archives. Standards development is a complex challenge that should be approached strategically with collaborations among stakeholders and involve many communications.

Connecting via Continuous Communications

During the Second Summit, many participants showed interest in learning more and connecting with other archives.

Yet, establishing connections between different organizations is not an easy task. Careful consideration must be taken, balancing the desire to enhance the network's growth and a manageable working team. Generally speaking, building a solid network relies on many good point-to-point connections; this also applies to establishing a global archiving network. The quality of the emerging archiving network also depends on how archives are connected; in this case, continuous communications are essential to retaining bonding between archives. The Summit series is at the forefront, bringing interested parties worldwide to begin conversations and initiatives toward new media art archiving challenges. However, relying only on a conference that happens once a year is not enough to channel participants' enthusiasm and maintain momentum. Additional ongoing communication channels may be needed; suggestions were given by Summit participants ranging from composing an archive/ email list and sending out a periodic newsletter to creating an online platform. Moreover, quarterly workshops, mini-conferences, or meetings may be held throughout the year hosted by different archives each time to keep in touch with each other and cover various topics where the hosting archive may have more insight. Although these are all great suggestions, they imply resources for ongoing management and organization.

Funding Initiative

With no financial support, the summit series has been mainly organized by the ISEA Archives with the other archive partners. With limited resources, funding initiatives have been discussed to support the growing demand for tasks related to connecting archives worldwide, including organizing the Summit and potentially forming an independent body with a more neutral position and organizational structure. As a result, to sustainably realize some of the abovementioned suggestions that the Summit participants gave.

Other Initiatives and Being Result Oriented

On the other hand, the Summit series can be instrumental in bringing in the right people, engaging in discussion, and starting other initiatives targeting specific issues in new media art archiving. The development of the Summit series and the abovementioned cross-institution data connection initiative that began after the First Summit are good examples of this. Taking the Summit initiative as an example, with an outcome-oriented objective of preparing the event, should help to gather appropriate partners, engage in more constructive ongoing communications, and establish long-term collaborative relationships. As a result of the ongoing communications, the involved parties for the Summit have iteratively triggered other initiatives to follow, such as the cross-institution data connection initiative and a few others currently in discussion.

A typical comment by a few of the organizing committee members and Summit partners in their more in-depth

interview or survey was that any initiative should be practically result-oriented with thorough follow-up. Despite being obvious yet essential for the success of an initiative, once it begins, it is necessary to stay focused on the results and have dedicated moderators who lead and follow up during the process, ensuring progress, milestones, and the actual outcomes.

Summit Partners Involvement

The survey result also indicates that over half of the participants were unaware that the Summit is a collaboration of all the Summit Partners. This result could be due to the development of the Summit initiative, which the Summit series has been a part of the ISEA Symposium. Moreover, the uncertainties caused by the covid pandemic for the last few years have limited Summit partners' involvement in the collaboration. Regardless, this implies the need for improvement in promoting the Summit as a collaboration of all the Summit partners. In addition, more of the Summit partners' exposure and participation during the different states of the organizing of the Summit is needed.

Other Recommendations

Besides the above summarized collected data from this Summit study, the following are some additional recommendations based on the researcher's involvement as an archivist and an organizer of the Summit.

Hosting Summit and Network Events

The emerging phenomenon of forming a global new media art archiving network was begun as a worldwide common demand for preserving the rapidly changing arts and art media of our time. The Summit series has gradually become a meeting point and creates bonding among new media art archives. Even though, at the current stage, the Summit is closely associated with the ISEA Symposium. The international nomadic nature of the ISEA symposium in a different city each year provides a unique opportunity to reach out to archives in different regions. It would benefit the growth of a global archiving network by continually having the ISEA Symposium as a host for the Summit and other relevant events.

Moreover, it is essential to acknowledge that the ISEA symposium organizers at the different locations had provided various levels of support to host the Summit, including mainly the venue for the Summit, general administrative processes, registrations, technical support, and the publication of the Summit papers in the symposium proceedings.

On the other hand, in response to the abovementioned suggestions of having periodic network events between the annual Summits, these events can either be co-hosted by all Summit partners. Or, as suggested, handled by one dedicated partner at a time with a specific, focused topic to maintain momentum and participant enthusiasm.

Organizing Committee

For the Second Summit, the organizing committee was formed mainly with representatives from the ISEA Archives and SIGGRAPH History Archive. To encourage more involvement from other Summit Partners, it is recommended that invitations be sent to representatives from the other Summit partners to become members of the organizing committee for the future Summit to help build the network and maintain a more neutral position for organizing the Summit.

Forming a Network Task Focus Group

As abovementioned, the Summit participants gave many excellent suggestions for maintaining communications among the archives, but these also indicate that ongoing management and organization efforts are needed. A dedicated team may need to be formed to handle all the required work as the next step, this work would include organizing the Summit series and other related tasks.

International Funding

One of the biggest challenges related to international funding is that many existing funding applications are usually restricted to a geographical area, and international funding supporting multiple regions is rare. More research and expertise in fundraising are needed to embark on this initiative to overcome the geographical limitation. Moreover, another approach could be reaching out to some international cultural organizations—for example, the United Nations Educational, Scientific and Cultural Organization (UNESCO). UNESCO is a specialized agency of the United Nations that promotes world peace and security through international cooperation in education, arts, sciences, and culture [15]. Or The International Council of Museums (ICOM International), a membership association and a non-governmental organization that establishes professional and ethical standards for museum activities [16].

Limitation for this Single Case Study

This single case study concentrates on an unprecedented phenomenon: the emergence of a global archiving network in new media art. Generalization will necessitate consecutive years of longitudinal case studies conducted during the New Media Art Archiving Summit series.

Also, as Liverpool Delercration suggested, paradigms of many other larger collective projects in other science disciplines can be used as a reference in further study assisting the development of a sustainable international structure and providing additional recommendations for establishing a global archive network.

Conclusion

The Summit series is a platform and communication channel for stakeholders in new media archiving. It aims to facilitate critical discourse and collaboration. Although the Summit does not directly solve problems in new media art archiving, it implicitly takes steps further by accumulating knowledge, connecting stakeholders in the field, and triggering discussions. As more collaborations and communications continue among archives worldwide, a global archiving network will be formed. As the network develops, it will gradually help systemically resolve new media art archiving challenges. It is a long-term endeavor requiring much collaborative effort and communication. The Summit core archive group is just the onset of a more mature global archiving network. It is essential to keep the Summit as a sustainable recurring event that engages more community members from the new media art archiving field.

To further investigate and reveal the overall trend and report on the global archiving network's development, the researcher intends to further develop this single case study into longitudinal case series, extending the research on the global archiving network for the later Summit editions. The current plan is to continue the study at the upcoming Third Summit on New Media Art Archiving at ISEA2023 Paris this May.

At last, meanwhile writing this paper, the researcher has the honor to co-direct the upcoming Third Summit with Wim van der Plas, co-founder of the ISEA Symposium and the co-director of ISEA Archives. Some findings and lessons from the Second Summit have already been incorporated into the forthcoming Summit's planning and organizing, emphasizing collaboration and coordination for all the Summit partners at the different phases of the Summit. Moreover, the discussion on establishing an international consortium has initiated during the preparation of the Summit among members of the International Programme Committee (IPC). The IPC is formed with representatives of the Summit partners, experts, and active members in new media art archiving. Further discussions are also planned in the Third Summit programme relating to connecting archives and future Summit planning. Aiming to make the Summit a sustainable event, consolidate the global archiving network, and lead to the possibility of forming an international consortium for new media art archiving.

As this is a critical moment in the field of new media art archiving and the development of the global archiving network, more details on the outcomes and further findings will be analyzed and reported in subsequent studies.

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Interoperability among the digital repository Tainacan and the information networks Wikidata and Wikimedia Commons: A case study of FILE ARCHIVE

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Abstract

The article proposes the development of a service that facilitates publication and monitoring of editions and collaborations made by users of memory institutions digital archives in environments such as Wikidata, Wikimedia Commons and Wikipedia. Therefore, it presents a technical modeling for a feedback service called roundtripping, which evolves the information networks from the wiki environment and Tainacan free software. Tainacan has been configuring itself as an important free software for the management and dissemination of digital collections from a network composed of Brazilians memory institutions. There are considerable technical and operational challenges for the implementation of a service that not only allows the publication of collections from a digital repository of a memory institution, but also the monitoring of the reutilizations, editions and collaborations of users in other information networks. By allowing the connection among Wikidata, Wikimedia Commons and Wikipedia information networks for the publication and encouragement of reuse of digital collections from institutions already published in Tainacan, this research aims to expand the circulation of heritage collections, makes the knowledge generated about them relevant and, thus, values Brazilian material culture in the network society. The objective of this research is to present in a case study format, how the roundtripping process has been modeled and implemented in partnership with the FILE Archive initiative.

Keywords

Tainacan, Roundtripping, Wikidata, Wikimedia, File Archive.

Introduction

The Wikipedia, Wikidata and Wikimedia Commons information networks currently constitute a set of important informational resources available free of charge on the Internet to the public, being widely used by society. The importance of these resources can be better understood when the numbers related to their operation are made explicit. Wikipedia, for example, works as an encyclopedia open to the collaboration of any user, with policies and governance rules that establish collective moderation dynamics, expanding the quality and informative potential of the content produced. Currently available in 310 active languages, with more than 56 million articles produced, more than 96 million users and more than 3,800 administrators worldwide [1], Wikipedia is constituted as a diverse and comprehensive source of information, appearing as a one of the first pages in search engines, such as Google, for various topics of interest. Users access Wikipedia, in 65% of cases, from a Google search, in which the search engine presents a link to references on the first pages or in its lateral information boxes, thus becoming a of the 5 most visited websites in the world [2]. For example, in the last year (data from June 2020 to May 2021) only the Portuguese language Wikipedia (https://pt.wikipedia.org/) had more than 391 million views and 228 thousand edits made by approximately 3,000 active editors on the platform [3].

Wikimedia Commons, in turn, works as a repository of licensed media files in order to allow its free reuse in other sites and projects on the web, currently counting with more than 740 million published files [4]. Finally, Wikidata works as a free knowledge base, allowing the structuring of semantic data through statements in the form of subject-predicate-object, currently presenting more than 93 million published items and becoming a central node for the viability of the semantic web on the Internet [5].

The 3 services together are integrated in order to provide an ecosystem of circulation and collaborative information production. Among its integration possibilities, the following three stand out. The images published on Commons can be used to illustrate entries published on Wikipedia, helping to provide informational resources of a pedagogical nature for a better understanding by its users. Structured data on Wikidata can be easily retrieved and presented as information boxes on Wikipedia entries, which facilitates the consumption of quantitative, temporal and categorical data. Files published on Commons can be described in terms of media, content and origin from metadata organized into semantic models that are integrated into Wikidata, favoring the cataloging process and expanding its search, recovery and reuse potential by other information systems. The article's objective is to discuss how the impacts of the integration between a digital repository of a cultural institution, and the wiki information networks, could benefit the interoperability strategies and

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dissemination of collections of this institution. Also, to present the concept of roundtripping as a way to develop such functionality and how this has been thought and modeled in the specific case of FILE Archive.

Memory institutions and the wiki information networks

Some recent research has shown that memory institutions such as archives, libraries and museums have become important providers of data for the wiki ecosystem, obtaining results of considerable impact by disseminating their collections in these information networks. Villaespesa e Navarrete [6], researching the English language Wikipedia, identified that 8,104 paintings from 785 museums in 59 countries around the world were used in 10,008 articles on Wikipedia. These articles altogether averaged more than 94 million monthly views during the year 2017. In a second survey, Navarrete and Villaespesa identified 224,374 items cataloged as paintings in Wikidata, of which 89,637 (40%) had metadata and 27,501 (12%) had an image [2]. Studying the use of these images outside the context of pages and articles specific to the art world, the researchers identified that the 3 themes that most received paintings from museums to illustrate Wikipedia entries were "history" (3,034 paintings), "religion" (924 paintings) and "geography" (600 paintings). This study manages to show how the museums' published digital collections become data providers for various themes and support the construction of its entries. Ferriter (2019) reports a case study focused on Wikidata initiated by the American Library of Congress, in which more than 650,000 references to identifiers from the authority control systems maintained by the library were recognized, namely the Name Authority File (NAF) and the Library of Congress Subject Headings (LCSH) [7]. During the execution of the case, the library carried out an experiment whereupon the user could browse more than 66,000 images, which represented 13,300 entities described by bibliographic metadata from Wikidata. The Association of Research Libraries [8] published a report pointing out recommendations and opportunities for the adoption of Wikidata by libraries. One of the main highlights mentioned by the report in its conclusion is the possibility of using Wikidata for the integration of several systems, maximizing its interoperability potential based on its role in providing meaning to the organization of information from different authority control strategies.

In Brazil, Martins and Carmo studied how the museums' pages linked to the Brazilian Institute of Museums (IBRAM) were built on Wikipedia [9]. Pages from 20 museums edited by 555 collaborators who carried out 1,108 editions were identified through the survey. The research points to a dynamic of collective construction of networked information about museums, showing an expressive collaborators agency in the construction of public interest

information. Carmo and Martins also studied the presence of Brazilian museums in the community led project that collaborates on Wikimedia Foundation called "Sum of all paintings", an initiative that aims to gather data on paintings worldwide in Wikidata [10]. The survey identified data from 30 countries and 56 collaborators. The research focused on identifying the presence of Brazilian institutions in this environment, finding 19 collections from 14 museums, representing a total of 3,583 paintings. Carmo and Martins also studied the presence of collections from museums linked to the Brazilian Institute of Museums on Wikimedia Commons [11]. In this study, they identified that 9 of these museums were present with 629 images of paintings. The research draws attention to the total number of views received by the published images from the Museum of the Republic, which had more than 4 million visits in 2019. Images from the museum's collection were used to illustrate historical entries of great public interest, such as, for example, President Prudente de Morais' Wikipedia page. Oliveira and Martins carry out an exploratory study to reconcile metadata from the digital collection of the Museu Histórico Nacional with Wikidata [12]. The researchers demonstrate that from the chosen metadata, only the "author" obtained significant reconciliation results, evidencing the lack of Brazilian cultural heritage vocabularies on the Wikidata platform. The mentioned surveys and the reported numbers show the potential for the circulation and collaborative production of networked information on wiki environments. The surveys also highlight the low participation of Brazilian cultural institutions, which allows inferring a potential yet to be explored.

Based on the above, it is recognizable that the presence of collections from cultural institutions in the wiki ecosystem generates a virtuous cycle of data reuse in different contexts, expanding its potential for cultural appropriation. In addition, there is the potential for feedback on data arising from the original cataloging of objects, based on suggestions, corrections and revisions made by users of these integrated knowledge networks. As Monteiro points out [13, p. 72]:

"Wikimedia projects collaborate in creating new hypertext links to such content, allowing them to be reedited, remixed and placed in new interpretive logics. In other words, it is possible to say that partnerships can enable the openly sharing of cultural collections through wellknown popular platforms, such as Wikipedia. And museums can only enjoy all the benefits of this openness to the world."

Roundtripping: conecting digital repositories and the wiki information networks

Once the social and cultural potential aroused by the presence of these institutions' collections in the wiki ecosystem is understood, it is worth asking how these collections should be published on this environment and, especially, how institutions could monitor their published objects, considering the ability to receive and evaluate the relevance of suggestions for improvements, corrections or revisions in the object's documentation made by Wikidata and Wikimedia Commons users and robots, as well as monitoring the number of views and the entries in which their images are used on Wikipedia. According to Vilaespesa and Navarrete, the key to dealing efficiently with this problem is to integrate the technical solution into the organizational workflow of the memory institutions' documentation [6]. For this, the authors propose the flow shown in figure 01. Note, highlighted in red, the museum's database from which, on the right, a segment whose branch leads to the arrow for metadata publication in Wikidata and another for publication of media related to the item in Wikimedia Commons. This data, once published, can be used by users on Wikipedia to illustrate entries, as seen at the top of the figure highlighted in blue. It is interesting to note that it returns to the museum, originating from the wiki ecosystem, information related to translations, data improvements and exploratory tools.

Figure 01. Flow of data production and feedback between a museum system and the wiki ecosystem.

The most prominent element in figure 01, which seems to
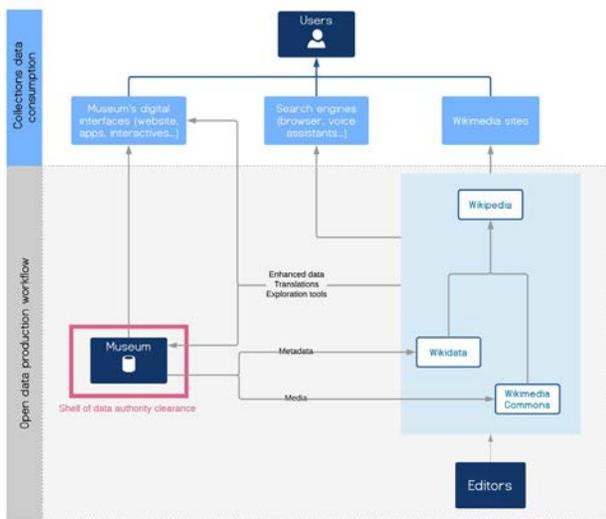
be the key to the process of automating the operational flow of publication and data feedback from the wiki ecosystem, is the museum's database system. It is presumed that this system has the technical possibility, based on associated annotation standards, to interoperate with Wikidata and Wikimedia Commons in a manner that such flow becomes operational and automated. Such an approach ensures that the intended meaning of the semantics linked to the

museums' databases can be shared among different applications within the scope of the wiki ecosystem. In addition to semantic sharing, the conceptual model linked to the museums' databases must provide means of transmission in some syntax agreed upon by the Wikidata community, which, in this case, would be through formats compatible with the semantic web infrastructures such as RDF/OWL, for example [14].

In another attempt to illustrate the concept of data feedback between a cultural institution's database and the wiki ecosystem, known in English as "roundtripping", a term that will be used throughout this project, researcher Sandra Fauconnier produced the illustration shown in figure 02 [15]. The image highlights the cultural institution expected actions, that is, the publication of new items, the inclusion of new metadata in already published items and the insertion of corrections made by the institution in the already published metadata. On the other hand, the image also highlights what is expected from the collaboration offered by Wikidata and Wikimedia Commons to the institution's database, that is, translations, new metadata suggested by users and corrections made to existing metadata.

Figure 02. Data feedback flow between a cultural institution's database and Wikimedia Commons and Wikidata.

Aware of this problem and the potential of this type of service for cultural institutions, the agency responsible for
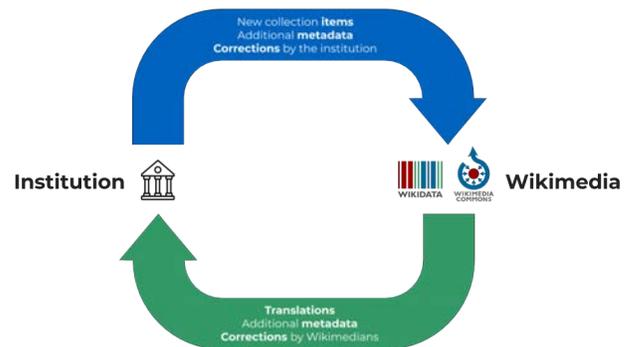
the Swedish government's cultural heritage policy, the Swedish National Heritage Board, began research the implementation of a service to give back to source institutions the metadata enhanced by users in the Wikimedia Commons environment [16]. In the published report with the first results of the research, Zeinstra affirms that the main interest identified in cultural institutions for this type of service would be the possibility of benefiting from the following functionalities: receiving new types of metadata that can be included in their databases, receive and assess the relevance of information on altered metadata (syntactic correction, identification of errors), receive metadata translated into other languages, receive and assess suggestions for new categorizations and thematic classifications of their media files, receive and assess digital alterations in their media (improvement of quality, contrast, noise, among others) [17]. At the end of the report, the

author recommends that, in order to make this service viable, it is necessary to reduce the technical barrier, by creating new simple functionalities for exporting data from the institutions' databases, and the adoption of APIs (Application Program Interface) for communication among systems and Wikimedia Commons. In the final research report, Larsson, Ånas, and Zeinstra point that one of the greatest difficulties encountered in the case studies carried out with Swedish institutions was the fact that they use different database systems, in which the process of data import and export had to be done in a customized way for each one of them [18]. This procedure increased the technical complexity of each stage, requiring customized solutions for each database, thus reducing the scalability capacity of the found solutions. The authors suggested a standard adoption, either for a collection management system to cultural institutions or for a data communication interface between systems.

Digital cultural archives in Brazil and the free software Tainacan

When reflecting on the Brazilian scenario and the possibility of enhancing the presence of collections of cultural institutions from this country on the wiki ecosystem, some boundary conditions must be taken into account. Initially, there is still a relatively low number of institutions that use specific software for cataloging collections. According to the 2019 ICT Culture survey by the Internet Steering Committee, only 31% of museums, 36% of libraries and 30% of culture points in the country use some type of collection cataloging software [19]. Better positioned in this ranking are archives, with 63% of them. It is noticed that most of the equipment still lack more systematized data management strategies for their documentation regarding the cultural objects in custody. Recognizing the structural fragility of the cultural sector in relation to the internet in Brazil, there were several initiatives and projects that tried to propose policies and governance models for digital cultural collections in the country [20]. Among the various Brazilian initiatives, the Tainacan project stands out for this proposal.

Tainacan is a free software for the management and dissemination on the internet of cultural institutions' digital collections developed by the Federal University of Goiás and the University of Brasília. It is currently supported by the Brazilian Institute of Museums (IBRAM), the National Arts Foundation (FUNARTE), the National Historical and Artistic Heritage Institute (IPHAN) and the Government of the State of Espírito Santo. The software is build as a plugin for WordPress, allowing the system to become a complete digital repository for managing and disseminating collections. Tainacan has been increasingly used for cataloging, managing and disseminating digital collections from Brazilian cultural institutions on the internet. One of

the factors that stands out in its growing adoption is that it is a free software developed within the scope of various cultural public policy initiatives. Another factor, no less important, is the fact that it is developed with a technology that is widespread in Brazil, the WordPress environment, widely used in the country for the development of websites. This knowledge generates a shorter adoption curve, given the greater number of professionals across the country who know and have experience in customizing websites on the WordPress platform.

According to the software download statistics provided by the WordPress distribution repository, Tainacan has been downloaded more than 9,000 times and has more than 400 active installations [21]. From the 30 museums that are officially linked to IBRAM, 20 of them already use Tainacan and make more than 15,000 items of cultural objects available on the internet [22]. The software has also been arousing university institutions interest for its use in collection management. Martins and Martins present a study in which they identified 17 university institutions in Brazil, Mexico and the United States using Tainacan to manage their collections, representing 63 collections with more than 11,890 items cataloged [23]. In addition, there are several recent reports in the Information Science specialized literature describing case studies of the implementation and migration of other digital collection management systems to Tainacan. Martins et al. present the case of Filme e Cultura magazine, an important magazine in the field of Brazilian cinema edited by the Ministry of Culture whose first issues date back to the 1960s, that was made complete available online with Tainacan [24]. Martins, Carmo and Germani also describe the migration of the Museu do Índio collection, an institution based in Rio de Janeiro and linked to FUNAI, in which more than 18,000 items from the PHL software were migrated to Tainacan [25]. Oliveira and Martins report the case study about the migration of the Fundação Nacional das Artes collection, in which they detail the steps of analyzing the information from the existing collection, processing the data and implementing 7 collections with more than 2,500 items available for public access with Tainacan [26]. The academic interest on research and implementation of Tainacan in various scientific projects can also be perceived by the number of documents mentioning the software on the Google Scholar platform.

At the time this research project has been in development, the platform already mentions 151 indexed documents, whereas in 2015 there was only one document and in 2019, 45 documents mentioning the project. From what was presented, it is possible to acknowledge that Tainacan has become a software widely used by cultural institutions in Brazil, becoming a platform with a broad base of cultural collections already available on the internet. This makes Tainacan a potentially viable software to work as a starting point for expanding the presence of Brazilian cultural collections in the wiki ecosystem. It is from this context that the problem to be worked on in this research project

becomes evident: how to implement in Tainacan free software the technical functionalities for the publication of metadata from its items cataloged in Wikidata and of the representative media of this items in Wikimedia Commons? Reciprocally, how to generate indicators and metrics in a way that edits made on Wikimedia projects can be monitored, collection managers notified about them through Tainacan itself and, if considered valid, these edits eventually be integrated into the local base?

FILE Archive case

In summary, the aim of this case study project is to present the research, the modeling, and what has been done to implement all the functionalities for carrying out roundtripping between the digital collections of cultural institutions made available in Tainacan and the wiki ecosystem. Methodologically, the project intends to carry out a case study based on the roundtripping functionalities that will be implemented in the Tainacan software, with the FILE Archive collection. The team of this important International Electronic Art Festival in Brazil already has an experimentation project with Tainacan, carried out since 2021, when FILE implemented a database composed of different collections and their respective items, which can be added in bulk or individually, directly from the computer or through importers. According to each collection needs, it is possible to configure taxonomies, metadata and specific filters. All activities carried out in the plugin are registered and listed and can thus be verified by the digital collection managers. The final structure of the digital repository is composed of 8 collections, each containing specific metadata of different typologies. FILE also established a partnership with Wikimedia platforms, being inserted in the GLAM system (Gallery, Libraries, Archives and Museums), which aim to make historical and cultural collections accessible in an open and free way, through the wikidata identifier (QID) as a disambiguation tool for artists names inserted in different archives, seeking to guarantee that the same artist inserted in a determinated New Media Art Archive, will also be in other New Media Art Archives. With the QIDs registered in the collections, it is then possible to create the necessary reference to experiment interoperability and connections with other New Media Art Archives. A series of new functionalities are being modeled at the current moment of the research; to demonstrate how this relationship between the links of a digital object in Tainacan and the Wikidata QID, can establish a lasting connection that works as a basis for the construction of interoperability solutions between information systems.

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Dalton Martins work with research on the interface between computer science and information science, focusing specifically on data science and websemantics/open data linked applications for digital collections development and data analysis of memory institutions' collections. Currently coordinates the Tainacan project, in partnership with the Brazilian Institute of Museums.

Paula Perissinotto is specialized in new media, contemporary art and digital culture. Graduated in Fine Arts at FAAP, with master's degree in visual poetics from ECA (School of Communications and Arts, University of São Paulo). Specialization in Curating and Cultural Practice in Art and New Media by MECAD / ESDI in (Barcelona / ES). Since 2000, Paula Perissinotto has been co-founder, organizer and co-curator of FILE International Festival of Electronic Language, a non-profit cultural organization that promotes and encourages aesthetic and cultural productions related to the new poetics of contemporary culture.

Towards the CYENS ArtTech Archive: Affordances and Opportunities of a R&I Institution as an Art, Science & Technology Stakeholder

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Abstract

Amongst the thematic schemes of the CYENS CoE is the fostering of art, science and technology (AST) synergies, and the development of infrastructures and archival practices to support the great volume of data under the cultural and creative sectors, powered by emerging technologies like Virtual, Augmented, and Extended Reality (VR, AR, XR). While this scheme is still in its genesis, it poses a distinct opportunity to establish an in-house and country-wide digital archive of New Media Art (NMA) that develops simultaneously with the artworks and AST projects it hosts.

This paper delves into the key considerations that are necessary to effectively collect, preserve, and provide access to NMA in a way that meets the needs of various stakeholders such as artists, scientists, and cultural producers. It also provides a methodological outline that incorporates state-of-the-art approaches in line with the ISEA Summits for New Media Art Archiving aims of archival connectivity; additionally, it employs the affordances of emerging technologies from parallel archival projects of the centre. By combining these affordances into an agile strategy, a reflexive archive can be developed from the growing database of CYENS' AST related activities that will serve both as a preservation tool and an active repository for artists and scientists. This archive could additionally assist the contributors to further develop and disseminate their artworks and practices, across cultural, scientific and industry circles. The goal of the proposed archive would be to become a local and regional documentation hub of NMA, preserving it for the future and making it accessible to an international network of institutions and archives.

Keywords

Art, science & technology; new media art; archiving; preservation; documentation; artist-centered digital archiving; archive as a multidimensional resource; local digital archive; Cyprus.

Introduction

Evolving from the electronic and digital technologies that have shaped the contemporary world, New Media Art (NMA) utilises and discusses technological developments, along with the societal shifts and plausible futures they constantly suggest. The conditions that arise from the diverse (im)materialities and dependencies of this genre, which includes artworks that utilise electronic, digital, web and virtual technologies [1,2], challenge the canons of established preservation methodologies, as well as the efficacy of traditional archival practises [3]. The urgent need for preservation and effective documentation strategies is well acknowledged; intense efforts for addressing them have been in the workings for the past few years, many of which have been explored and developed through the ISEA Summit of New Media Art Archiving. Presently, the leading institutions in the field are pursuing much-needed policy, synergetic, and interdisciplinary transformations [4].

Considering these realities, a hyperlocal gaze in Cyprus reveals that there is a complete absence of any institutional or other structure dealing with the acquisition, documentation, or preservation of NMA related activities. Local and international artists are active in the Cypriot artistic scene, presenting a wide range of examples of media art practices. However, outside of periodical exhibitions and happenings displaying such artmaking, a limited number of new media artworks have been acquired or documented by any institutional structure able to contextualise, safeguard, or care for them, leaving the local NMA scene largely unexplored.

Amongst the few institutions that are currently focusing on new media related art practises in Cyprus is the CYENS Centre of Excellence. Even though CYENS is not a cultural or art institution but a research and innovation centre, it has been hosting art, science and technology (AST) residencies and projects, as well as projects developing infrastructures and archival practices to support the cultural and creative sectors. These activities have engaged not only media artists, artworks, and interdisciplinary art, science, and technology synergies, but also the building of technical and technological capacities related to digital archiving.

In the following section, the structure and practices of the Centre will be presented. We argue that through its institutional format, research and innovation dynamics and AST-oriented interests, the Centre is uniquely positioned to address the contextualisation of AST projects and eventually address the issue of NMA documentation for Cyprus. Taking equally in account the current synergetic and interoperability strategies that are developed by the key institutions

in the field, the inauguration of the CYENS ArtTech Archive can have a dual function: serve as the first local AST archive and contribute to the international efforts of effective documentation and dissemination of NMA.

The potential of a reflexive AST Archive situated in a Research and Innovation Institution

CYENS CoE focuses on interactive media, smart systems, and emerging technologies. The centre is a joint venture between the three public universities of Cyprus - University of Cyprus, Cyprus University of Technology, and Open University of Cyprus-, the Municipality of Nicosia, and two renowned international partners, the Max Planck Institute for Informatics, Germany, and, the University College London, United Kingdom. Disseminating knowledge and academic excellence, while supported from local and international institutions, and having the Nicosia Municipality as the key policy-maker partner, the centre acts as the catalyst between high caliber scientific and technological research, and the local communities and industry. While the centre is rather young, having opened its doors in 2018, the last two years have been pivotal in broadening its vision and strategizing in niche areas of interest.

A number of multidisciplinary groups, each focusing on specific topics, produce high quality research and applications. Amongst them, two research groups, the Museum Lab and Immersive Technologies for Intelligent and Creative Applications (ITICA) group, and the Thinker Maker Space (TMS) of the centre, have individually and collaboratively developed AST related projects and activities or have partnered in projects that focus on the development of infrastructures and archival practices to support the cultural and creative sectors, powered by emerging technologies.

One of the centre's strategic application areas is titled "Arts, Culture and Technology", via which the centre's state-of-the-art facilities and interdisciplinary expertise is employed, facilitating and promoting activities relevant to the cultural and creative sectors associated with research and technological development. CYENS aims to become a central art-science hub of arts, culture, science, and technology in the region and become influential in promoting socio-economic stability in the Eastern Mediterranean and Middle East (EMME) region.

In particular, the Thinker Maker Space (TMS) has been running an international artist residency program since 2021, having hosted up to now 11 interdisciplinary resident artists, experimenting on the intersections of AST; the relevant international open calls have received significant interest, collecting more than 300 applications during this short period. TMS also organized more than twenty talks, workshops, and screenings, as well as 7 individual exhibitions. Further, the TMS has consistently participated as a key partner in industry projects where design thinking and cutting-edge technology, implemented via digital fabrication and rapid prototyping, were key to project development and the realization of impactful results.

The Museum Lab has completed several research and applied projects, as well as publications related to: the future of technology in museums and heritage sites with special attention to the concepts of presence, embodiment and multi-sensory experiences; participatory and inclusive technologies; deep mapping; digital humanities; and arts and technology.

The ITICA research group has been contributing its expertise of virtual & augmented reality, machine learning and cognitive sciences in numerous projects. The group's special interest in arts & technology was first demonstrated through its participation in the 2020 Ars Electronica Festival, curating the WADS Garden Nicosia. Representing Cyprus in the STARTS – Repairing the Present consortium, as the first ever Cypriot Regional Centre, it hosted, together with the TMS, its first artist residency in 2022. Besides the close collaboration on projects with the TMS and the Museum Lab, ITICA has been involved in at least two major European projects working towards virtual, collaborative and interoperable museum databases, and digital archiving methodologies for art and other cultural artifacts.

The three groups co-organised the first Work in Progress (WIP) showcase in November 2021. This AST focused initiative brought together creatives and technologists – local and visiting – with the aim to initiate a dialogue between disciplines and establish future collaborations. In its second edition, in November 2022, WIP evolved into a festival, that developed under the title "Brave New Humanity". It hosted over 80 experiences, exhibiting media artworks, interactive performances, AST related research projects, talks, workshops, screenings, and interactive games from invited local and visiting artists, universities, organizations, and CYENS.

In the short period of two years during which this "Digital Creativity in Arts & Culture" direction was slowly adopted, the three groups have already engaged with a significant number of AST driven artists and organized art exhibitions, seminars, and workshops. In 2021, a PhD Fellowship was announced with an aim to examine archiving practices and their methodologies and design a pilot archive for CYENS. The successful candidate was the 1st author, and the ArtTech Archive project was thus born.

The ArtTech Archive is presently being conceptualized as part of an ongoing research project under the Digital Creativity in Arts & Culture strategic area of CYENS. This research aims to establish the basis for an open and reflexive archive of CYENS affiliated, current and upcoming AST projects. Currently, a participatory action research methodology is informing the overall theoretical approach. The design of thematical semi-structured interviews will help document the expertise and approaches of scholars and experienced practitioners of NMA archiving, while focus groups will document the perspectives of AST creators which have worked under the CYENS initiatives. The results and combined insights from established methodologies, the latest international developments and CYENS affiliated, in-the-wild art & technologies contributions aim to underpin the theoretical framework and standards of the ArtTech Archive.

Throughout this process, the ArtTech website will serve as a reinforcement tool, hosting the research's progress, including speculative versions of archival assets and possible interactions, and future planning. Furthermore, we expect that this process will assist in the initial identification of the technical requirements of such an archive, i.e., the different data models and representations required for storing the relationships between the archives.

While defining the objectives and functionalities of this archive, it's imperative to take into account the needs and challenges media artworks carry, consider the socioeconomic characteristics of the NMA/AST ecosystems and pay attention to the current efforts that are taking place on an international level to promote collaborative and interoperable archival systems. Bearing these in mind, an opportunity of contributing additional functionalities to the NMA developing archival practises and affordances arises.

Upon completion of this research, the technical requirements for the CYENS ArtTech Archive will be documented, serving as the foundation for its development. Once the technical requirements are established, the development of the first public CYENS ArtTech Archive will commence with the vision to enable scholars, researchers, artists, and the wider public to explore and engage with the rich history and diversity of media art, contributing to the continued growth and evolution of this field. However, it is important to mention that the process and methodology of creating this pilot archive is the most important outcome of the project.

Towards a reflexive and extrovert archive

As a database has been organically evolving within the AST activities of the center, the assets and processes that have and will continue to populate it, are collected simultaneously with the conceptualisation of the ArtTech archive. An agile strategy to transform this growing database into a reflexive archive, will need to fulfil the following three-fold criteria: i) for the archive to be employed as a preservation tool, ii) to serve as an active repository framework and iii) as a dissemination platform. To ground these intentions, the refinement and contextualisation of the already collected logs and data from the centre's AST activities between 2020-2022 will inform the developing theoretical research.

ArtTech as a preservation tool: Any archival process is inherently linked with artwork preservation processes; as Mordel argues, often, artists can complexly conceptualise the preservation needs that their artwork may entail, yet the role of a digital archivist in communicating the urgency of early-stage digital archiving remains essential [5]. Archival logs can be a holistic format of preservation for events, talks, seminars, research papers and presentations, yet they cannot hold the physical expressions of AST projects and artworks. Nevertheless, NMA/AST projects' longevity depends heavily on preserving their digital, source code and software

components, along with their creative, technical, and theoretical processes, which can be effectively preserved in an archival format. The nature of hosting such projects at CYENS, especially the artist residencies, is tightly bound with technically supporting and enabling the collaborating artists and scientists, with each creative process being substantially observed and recorded to the extent possible. This level of involvement in the production of the projects has enabled us to discuss, support and enable artists and scientists to develop best practises in documenting their artistic and technical methods and informing them of possible data preservation issues from the early creative stages. In certain instances, we have suggested pre-emptive actions to secure manageable and flexible versions of datasets and assets.

The majority of the artworks and projects currently populating the database have multiple components, contributors and theoretical bases, while their digital/technological components have varying degrees of visibility in the final artwork or display format. Currently, we use an internal Tech Rider and General Information template we have developed, informed by international protocols and methodologies [6,7], allowing us to have satisfactory logs and resources for the initial indexing. Additionally, we have openly available form[1] to collect basic information and intentions from artists, researchers, and other contributors. Nevertheless, these templates and forms need to be further enriched to collect more extensive information, details and assets to adhere under a complex, yet flexible indexing system. It is our goal to utilise this research's findings to optimise the relevant information collecting documents. Additionally, the various types of digital assets need to adhere to an allied indexing system and hosted on a common server or cloud storage facility.

The synchronous development of archive/archival subject aims to alleviate the burden of basic sanitization the database, as faced by numerous larger and older archives [8] and allow for the developing database to be cross-checked and be aligned with existing archives. Cross-checking data with other archives may be applied for basic information of each contributor (accurate names, biographies, affiliations, general artwork description etc.), as well as regarding the prevalent terminology and keywords used for contextualisation, whenever it is of course applicable and appropriate in the representation of the log/asset.

ArtTech as an active repository framework: Another functionality the ArtTech archive would perform is allowing the artists and scientists to maintain, evolve and make visible the most important iterations of their projects on the archive's framework. The centre's interest of applying academic research into broadly reaching innovative practises can be greatly explored through providing the artists and scientists niche technological support, utilisation new digital tools, as well as source asset repository functions for the backend datasets related to each project's iterations and

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[1] The template documents that are openly available are the following: TMS_AiR_Exhibition_Information_Form - bit.ly/3KZu6BZ; TMS_Workshop_Information_Form - bit.ly/3kQBGEb; TMS_Talk

Information Form - bit.ly/3mnzu7w; TMS Residency Application Form - bit.ly/3JloznO.

modifications. Such features can support the future development and dissemination of the artists' and scientists' practises across the artistic, scientific, and industrial spheres. Its educational and cultural contributions can similarly extend locally and internationally, to reach broader audiences, industries, and cultural scenes, acting as an educational, technology development and distribution resource, suggesting such practises as a direction to be adopted by other institutions and digital platforms.

ArtTech as a disseminating platform: A final but equally significant aspect of the ArtTech developing archival project is the operability and interface of the public resource system to be launched. Often, the cluttered, unclear, or even outdated visual identity of any website or online resource becomes a hurdle to its widespread adoption. For this archive to be accessible and diverse, it is essential to make its content and the semantic connections between the projects it hosts, the broader context themes and concepts, and eventually connected archives, readily accessible. This is directly connected with the indexing and contextualisation stages that were aforementioned. Nevertheless, translating it into an easy-to-navigate and inviting user experience will likely be the most difficult challenge.

Creators' roles and other institutional affordances

While the centre has maintained an ongoing dialogue with most artists and scientists that were hosted by the center's AST activities, we aim to secure a long-term communication strategy, to formally include the artists, scientists and other contributors in the formation of the archival structure, capabilities and propagation. Evolving from the informal discussions and exchange of ideas on the archive's structure, the artists and scientists will be approached through a focus group methodology, similar to expert group methodologies applied by other media art initiatives [9]. By developing an in-depth discussion and joined workplan, a new type of collaborative partnership beneficial for both artist and archiving institution can be fostered.

It is important to stress that beyond its technological capacities, CYENS has to offer expert theoretical resources and practises, which are accordingly contributing to the contextualisation of the AST included projects within the broader media art theory and history discourses. The structure and affordances of the archive will be equally evaluated and informed by the current art and media historic and archive research.

Concluding, through the ArtTech archive, there is the potential to formulate the first local contextualization of AST practices, establishing a basis that may eventually expand, inviting local institutions and museums, galleries, artist-led spaces, and individuals to thoroughly log their new media artworks, projects and related activities, constituting it as the much-needed archival resource representing the local NMA scene and developments. In order for this archive to reach its full potential, it would need a long-term viability scheme, beyond the confine of a PhD project, supported by governmental and European funds and the infrastructures of

CYENS. As CYENS has an institutional affiliation with the Nicosia Municipality and the three public universities, it has the means to address institutional responsibilities that concern not only excellent research on technology but also supporting and developing the creative sector. It also has the capacity to apply its expertise in securing relevant funding for the development of this reflexive archive and putting into practice already acquired expertise and resources. Finally, it can contribute from its genesis to the developing international interoperable archival structures proposed within ISEA Summits on New Media Art Archiving, becoming a valuable stakeholder in digitally powered and dependent cultural content.

The ArtTech Archive has the capability to serve as a hosting platform for artists, researchers, and scientist. It can become the digital platform where they will be able to host, update, preserve and disseminate their work. By activating transparent and inclusive processes, iterating archival subjects, and intuitive archival taxonomies and interfaces, it can become a truly interconnected hub for regional AST practices that will be developing synchronously with evolving technologies.

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Myrto Aristidou holds a bachelor's degree in Fine Arts from the Athens School of Fine Arts (2009) and a master's degree on Heritage and Interpretation, Department of Museum Studies of the University of Leicester, UK (2013). Her research interests include museum studies, art and museum education, art, science and technology synergies, and archival practices. She is currently a PhD student in the Department of Multimedia and Graphic Arts of the Cyprus University of Technology, Limassol, Cyprus, and a Research Fellow at the CYENS Centre of Excellence, Nicosia, Cyprus. Her PhD research focuses on digital archives, art, science & technology synergies and media art.

Theopisti Stylianou-Lambert is an artist/researcher. She is interested in the ontology and workings of everyday photography and archives, as well as the intersections of new technologies and photography. Theopisti is a member of the advising committee of the peer-reviewed journal "photographies", the vice-chair of the "International Association of Photography and Theory", a curator of the IAPT Photobook show (2016, 2018, 2021) and has received several international fellowships and awards. She has exhibited her work in a number of art exhibitions in Cyprus and abroad and she is passionate about photobooks. She is currently Associate Professor at the School of Fine and Applied Arts at the Cyprus University of Technology, and the group leader of *Museum Lab* at CYENS Centre of Excellence.

Kleanthis Neokleous graduated from the University of Cyprus in June 2011, with a Doctorate in Computer Science and has a multidisciplinary academic background in various fields including Virtual Reality and 3D graphics, Electronic Health (eHealth), Cognitive Psychology, Computational Neuroscience, Machine Learning and Space Science and Technology. He was involved with the conception, design, preparation, writing and coordination of many National and EU research projects. During and after his PhD, Dr. Neokleous co-founded in parallel two innovative startup companies in Virtual Reality technologies and eHealth applications in line with his aca-demic and research interests. Since June 2019, he is the team leader of the Immersive Technologies for Intelligent and Creative Applications (ITICA) Multidisciplinary Research Group (MRG) of the first Research Centre in Cyprus focusing on Interactive media, Smart systems and Emerging technologies (CYENS).

Kyriaki Yiakoupi holds an MA in Conservation Studies (Historic Buildings) from the University of York, UK, 2011 and BA (Hons) in Interior Design from the University of Wolverhampton, UK, 2010. Kyriaki has participated in several international multidisciplinary projects with expeditions to develop her skills in the Conservation of Cultural Heritage. Kyriaki's main scientific interests are related to the ethics and philosophy of conservation, the analysis and interpretation of the historic buildings, along with the introduction of many different techniques of 3D technological equipment in order to understand the static and pathological condition of the structure, the geometry, the style and preservation accuracy through 3D architectural modelling and Digital Cultural Heritage Technologies.

Piloting Shared Born-Digital Archives between the US and Europe

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Abstract

Containing several thousand works from the 1980s to today, the Electronic Literature Organization's (ELO) The NEXT, created and managed by the Electronic Literature Lab (ELL, Washington State University Vancouver), is the largest repository of born-digital literature and net art on the web. It provides free online access to early hypertext fiction, animated poetry, literary games, and more, including many works otherwise now inaccessible due to obsolete software and hardware requirements. This essay presents a project to extend ELO's The NEXT by setting up a new server in France to hold a copy of the collections, developing local curatorial and research activities to preserve European works, to be shared back with the US server, and growing a digital art and literature preservation network in Europe for sharing and collaboration. The project will include a participative Wikidata initiative on electronic literature to enhance the discoverability and searchability of the collections, which could be an opportunity to integrate this born-digital literature focused archive with the Connecting Archives project and feed the data into a shared database. The paper invites discussion on the requirements of such alignment and the best way of working together towards a global new media archive.

Keywords

Electronic literature, net art, born-digital literature, born-digital literary archives, emerging formats, born-digital preservation, distributed archives

Introduction

This essay has two main objectives. First, we present a pilot project to grow the currently largest fully open-access born-digital literature repository, ELO's The NEXT, managed by the Electronic Literature Lab (ELL) at Washington State University Vancouver (WSUV), into a distributed network of shared born-digital literature archives worldwide. [1] On this basis, we then invite discussion on how this project could contribute to, and be aligned with, the Connecting Archives initiative. As such, this essay addresses Topic 1 and 3 of the Summit: "Building on the results of Summit 1 & 2" and "Ideas and proposals to help the Connecting Archives project". More specifically, it is relevant to the following topics from the 1st and 2nd Summit: Communication and Coordination among Archivists; New Directions in Online Archiving; and New Technologies for Archiving. We build on the following papers from Summit 1 and 2 (connections specified in parentheses): Scott Rettberg: ELMCIP Electronic Literature Knowledge Base (2020) (building on the CELL network and creating a networked archive for collection and preservation); Bonnie Mitchell, Alexa Mahajan, Luis Wilson, Dalton Lopes Martins: Interconnecting Archives: Paving a Path Forward (2022 panel) (LOD development with a view to and integrated born-digital art and literature database); Tabea Lurk & Jürgen Enge: Accessing and Displaying the Archive (2022) (human accessibility assessment and enhancement); Bonnie Mitchell, Janice T. Searleman, Wim van der Plas & Terry C. W. Wong: Connecting new media art archives worldwide (2022) (connecting archiving efforts, practices, and resources); Oliver Grau, Laura Ettel, Philipp Hoffmann, Alexander Wöran & Carla Zamora: Revealing Higher Impact of Media Art Archiving (interest in application of the archives in teaching); and Bonnie Mitchell & Oliver Grau: Towards a Global Distributed Network of New Media (2022 roundtable) (interest in joining a global network of new media archives_.

Context

Electronic Literature

Born-digital or electronic literature – broadly defined as works that engage with the computer's specific capabilities and exhibit a substantial creative linguistic aspect – is situated at the crossroads of literary traditions, language, visual arts, digital technology, and contemporary culture. As such, it constitutes a continuum with other forms of born-digital art and writing, including computer art, net art, new media art, and video games. Since the 1980s, from hypertext fiction to animated poetry and literary games, and most recently social media-based projects and AI-generated texts, born-digital literature has represented a forward-looking aspect of culture, offering critical insights into how language, art, literary traditions, and technology have impacted one another, and marking a new paradigm in the history of writing comparable in importance only to the birth of print literature. [2] [3] Such "complex digital publications", however, represent a collection and preservation challenge for archives, libraries, and museums because they are highly

unstable, including when archived: the hardware, software, and infrastructures they rely on are subject to rapid change, deterioration, and obsolescence. [4] [5] Finding technical solutions for stabilizing and making these artefacts accessible for researchers and the general public is, therefore, essential for our understanding of late-20th and 21st-century culture and society. [6] [7] In the age of growing concerns about the environmental and health impact of global travel, it is also crucial to establish archives and exhibition spaces fully accessible remotely.

ELO's The NEXT contains over 3000 works of born-digital literature and net art and scholarly information relating to them. All works listed in the catalogue are archived in the repository, that is to say that the ELL holds a copy of the actual files pertaining to the work deposited by the copyright holders. The web interface presents the works grouped in author, journal, or anthology-focused collections, and proposes showcases and thematic exhibitions.

History and rationale of the project

Led by Dene Grigar and supported by WSUV and the international community of ELO, ELL has been at the forefront of devising solutions for both the preservation and presentation of born-digital literature, with a particular focus on making available otherwise now inaccessible works, such as those created with the recently discontinued Adobe Flash. The cutting-edge virtual museum/library/preservation space of The NEXT makes 40 collections of born-digital literature accessible to the public, including visitors with disabilities, facilitating both scholarly research and exploration by non-specialists. Currently in its fourth phase of development, ELO's The NEXT was originally seeded in 2018 by a grant from The Andrew W. Mellon Foundation submitted by Grigar and others. Phase 1 saw the development of the repository and the production of metadata of the individual works. Providing support during this phase was the Electronic Textual Cultures Lab at the University of Victoria and Compute Canada. Phase 2, begun in fall 2020, resulted in a new user-friendly interface and the extended metadata schema, ELMS. Phase 3, completed in May 2021, saw the reconceptualization and reconstruction of the site into a virtual, multimedia space and rebranding as ELO's The NEXT.

With this foundation established, it is now ready to be distributed to international research sites for assured durability and accessibility over time, and for a distributed and diversified collection development and use. Sharing copies of the archives to labs and servers in different physical locations will ensure enhanced safekeeping. A distributed network will also enable various teams to work on different preservation projects and enrich the collections simultaneously, sharing them across the network for safekeeping and alternative access. These efforts will help to address two of the main challenges currently facing born-digital literature preservation: the fact that 1) there is an important amount of works waiting to be archived and at risk of being lost due to technological obsolescence and lack of accessibility, and 2) that this digital heritage exists across continents, countries, and languages, requiring a variety of language competency,

expertise in the given cultural space, and local access and connections to identify and obtain existing copies of works as well as the authorization to make them available in an open-access repository. We propose to build The NEXT France as a pilot and first new site of a planned network, providing the opportunity to develop the necessary workflow for sharing and enriching collections and metadata across borders and languages.

European national libraries, such as the French National Library (BnF) and the British Library (BL) have been collecting and researching emerging formats in recent years, feeding the French Archives de l'internet and the UK Web Archive and building thematic collections of captured playable instances of interactive websites. [8] [9] They have also been experimenting with collecting other formats, such as video games, electronic literature on now obsolete physical media (BnF), or apps (BL), and aiming to scale up their collecting activities via collaborations with other institutions that pioneer digital preservation research. The BnF has also collaborated with digital poet and scholar Philippe Bootz in making accessible some of the now otherwise inaccessible classics of French digital poetry on designated computer terminals in a reading room. [10] Due to the relevant legal deposit legislation as well as practical limitations related to obsolete dependencies, emerging formats are mostly accessible onsite in both national libraries, however. The BL is nevertheless also interested in connecting with openly available online collections, in line with its "Enabling access for everyone: the British Library's content strategy 2020-2023".

Other projects such as ELMCIP, Rhizome, and ADA offer information about works, displaying them via external links, but mostly not hosting the works themselves. More than a database or directory, ELO's The NEXT is unique as a *repository* of openly accessible local files of born-digital literature and net art and detailed documentation as an enhanced curation approach. [11] [12] [13] While institutional structures often separate born-digital art and literature, the boundaries remain blurred, and much of the preservation and curation concerns and methods are similar. Archives and preservation initiatives, just like research, often exist in isolation. [14] With this project, we also aim to open new avenues to sharing collection and preservation practices of works being made today with cutting edge technologies, including extended reality, AI, geo-location, live data/live coding, and social media.

Project Goals

In setting up The NEXT France, our goal is, therefore, to provide a proof of concept for a distributed network of shared born-digital literary archives and to develop born-digital literature preservation activities in France. We will address the following research questions:

- How can we secure born-digital art and literature archives and enhance preservation practices through a network of connected archives and preservation labs?
- How can we best improve the use, visibility, accessibility, and interoperability of born-digital archives through

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enhanced metadata and linked open data (LOD) and join the Connecting Archives initiative? [15]

- What can preservation teach us about born-digital literature and the interactions between language, culture, and technology?
- What are the interests and challenges shared across born-digital art and literature preservation, curation, and research, and how can collaboration stimulate insights?

The specific objectives of the project are to:

1. Set up a server for a born-digital literature archive in France – namely, at the Laboratoire Patrimoine, Littérature, Histoire (PLH, Heritage, Literature, History Laboratory) based at the University of Toulouse 2 Jean Jaurès, potentially in collaboration with the Costech laboratory of the University of Technology of Compiègne, holding a version of ELO's The NEXT, thereby piloting a global distributed network of digital literature labs; [16]
2. Create the first born-digital literature library in France that will act as a proactive interdisciplinary research networking hub and experimental space, federating existing and emerging electronic literature preservation initiatives in Europe, building on the ELO and CELL networks;
3. Initiate a US-France collaboration for the development of born-digital preservation practices and pilot the workflow for networked collection development, with a focus on:
    3.1. Refining the metadata schema for emerging digital formats and developing LOD for born-digital literature through Wikidata, in collaboration with the Connecting Archives project for interoperability
    3.2. Piloting the integration of The NEXT catalogue into a standard French university library catalogue for increased visibility for teaching and research;
    3.3. Developing the collections further with French and other European born-digital literature;
4. Raise the visibility and increase awareness of the relevance of born-digital art and literature for digital cultural literacy, actively engaging with a range of audiences in critical thinking about the interactions among language, culture, and technology.

Methodology

Creating The NEXT France server and migrating collections

ELO's The NEXT has been built with open web languages and hosted on a basic Apache server, making it possible to port it to another site. Because ELO's The NEXT holds thousands of born-digital works, however, once moved it is crucial to test them in order to ensure that all files have been transported and any software dependencies, addressed.

Based on ELL's experience, we anticipate the migration and testing to take eight months. The virtual server created for hosting The NEXT France will be managed by a project technician trained by ELL's experienced technician, under the supervision of the local French project lead, and guidance from the local information systems services. The NEXT France web resource will initially copy ELO's The NEXT, then develop its own identity with a recognizable family link to The NEXT network in its appearance.

Collection and metadata development

Refining metadata for born-digital literature

To address the specificity needed for the born-digital, interactive, and experiential materials that ELO's The NEXT collects, ELL extended the Metadata Object Description Schema (MODS) maintained by the Network Development and MARC Standards Office of the Library of Congress to include and expand upon taxonomies developed by the Consortium on Electronic Literature (CELL), resulting in ELMS (Extended eLectronic Metadata Schema). [17] [18] More recently, ELMS has been further extended to address the needs of visitors with disabilities and sensory sensitivities by identifying the materials' physical requirements and the accessibility tools needed, a project seeded by a grant from the Society of American Archivists. [19] This activity moves beyond the Americans with Disabilities Act in the US and the Equality Act of 2010, including the Disability Discrimination Act 1995 in the UK to address disabilities justice concerns.

Develop linked open data on born-digital literature

We propose to work with Wikimedia France to set-up a born-digital literature Wiki project, tracking progress via the Programs & Events Dashboard. [20] We will organise two Wikithons to be held at the ELO conferences, building a community of volunteer editors to create and enhance Wikidata entities and Wikipedia articles of authors and works of notable born-digital literature, with a focus on the non-English speaking world, marginalised groups, including people with disabilities, LGBTQIA+, indigenous communities, religious minorities, and people of colour. We envision aligning this aspect of the project with the Connecting Archives project to ensure interoperability and that the data also feeds into the global database for better discoverability, complementing the information available on born-digital arts in the other participating archives. [21] [22]

Library catalogue integration

We will work with Toulouse University Library's (BUC) metadata librarian to map the ELMS metadata to MARC, used by BUC. We will write a crosswalk script to translate the metadata for integration in the library catalogue. Addition of records to the live catalogue will be subject to approval by library staff to ensure they are an appropriate fit with the library's collections. The catalogued items will contain the link to the relevant item at The NEXT France.

This integration aims to affirm the place of electronic literature in the overall landscape of contemporary literature and facilitate teaching and research activities in the field.

Collection development

A pilot born-digital preservation project will allow us to develop and test the workflows and infrastructure that enable the teams around each server to work independently on local initiatives and share new additions to the archives. The pilot will also make available the digital works published in the pioneering French digital periodical *alire*. [23] The 14 issues of this journal spread across its 20-year history contain 92 generative, animated, and multimedia poems created for evolving generations of PC and Mac. Working with founder, author, and editor Philippe Bootz, we will assess the works' technical requirements and create a virtual machine for each piece built with now obsolete software and hardware dependencies. This approach will emulate the original hardware and software environment and make the works executable on contemporary computers. We will of course only include works for which we can obtain authorization from the authors.

Teaching, dissemination, and engagement

Based on the pilot experience of distributed collection development, we will prepare training materials for the global born-digital preservation community, as well as guidance for teachers, students, and the general public who will access the archives. The new European collection will also be the basis of teaching materials for new interdisciplinary undergraduate and postgraduate modules on digital art and literature, fostering collaboration among literature, art, media studies, and computing degree programs. We will welcome the results and experience of previous initiatives in shaping our approach to designing teaching and learning activities based on the archives. [24]

The preservation activity and the new digital archive site and collection will also provide an opportunity to increase their visibility through a public launch event involving the local public library in Toulouse (Médiathèque José Cabanis) as well as the French National Library, with the participation of one or more artists whose work is included in the collection (ex. Philippe Bootz, Eric Sérandour). The archives being openly available including through the public libraries' computer terminals, we will also work with them to develop new approaches to digital literacy training for general audiences as part and continuation of their existing initiatives in this field.

Conclusions

Overall, this project will provide a proof of concept for the distributed network of archives based on the premise of close collaboration through collection sharing and work division. It will elaborate the methodology of extending the network with new nodes as well as the preservation workflow and enhance safekeeping of the archives as well as their visibility. The LOD and participatory database development component will provide the possibility for joining the Connecting Archives initiative, reducing the disciplinary and institutional divide that separates creative born-digital artefacts into art and literature collections, while nevertheless also allowing to maintain the identity of the fields for practical and research purposes such as work division and historical approaches. We are currently seeking funding from national and international bodies for the realization of this project. We would like to invite discussion on the best ways of working together and moving forward and welcome expressions of interest in collaboration and partnership.

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Authors' Biographies

Erika Fülöp is Professor of Twenty-first-century Literature, Digital Humanities and Creative Writing at the University of Toulouse 2 Jean Jaurès, where she is a member of the Heritage, Literature, History laboratory. She was previously Lecturer then Senior Lecturer in French Studies at Lancaster University (2015-2022), Postdoctoral Fellow of the Alexander von Humboldt Foundation at the Interdisciplinary Center for Narratology in Hamburg (2013-15), and Lecturer at New College, Oxford (2012-13). Since her doctoral thesis and first monograph on Proust and philosophy titled *Proust, the One, and the Many: Identity and Difference in* À la recherche du temps perdu (Oxford, 2012), she has been exploring diverse modes of authorship that question and expand the concept of writing and literature, especially digital modes of expression. In 2021 she benefitted from an EPSRC grant to learn about the technical aspects of creating and preserving digital work. Her research diary can be found here.

Dene Grigar is Professor and Director of Creative Media & Digital Culture in the Department of Digital Technology & Culture at Washington State University Vancouver whose research focuses on the creation, curation, preservation, and criticism of born-digital media. She has authored 16 media works, 71 scholarly articles, and six books. She has curated exhibits at the British Computer Society, the Library of Congress, and for the Symposium on Electronic Art, among other venues. With Stuart Moulthrop (U of Wisconsin Milwaukee) she developed the methodology for documenting born-digital media, a project that culminated in an open-source, multimedia book, entitled *Pathfinders* (2015), and book of media art criticism, entitled *Traversals* (2017), for The MIT Press. Her forthcoming book is *Challenges of Born-Digital Literature: Editions, Translations, and Emulations*, co-authored with Mariusz Pisarski, for Cambridge UP. Grigar serves as the Managing Director & Curator of organization's The NEXT and directs the Electronic Literature Lab.

-Papers: Open New Media Art Archives To The World-

Strategies and Conditions of Video Art Collections in Latin America

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Abstract

This work is an extensive research survey on Video Art Collections in Latin America. The objective is to propose several paths for more systematic study and discussion in the future, which should include greater detail on the artists and their works, the preservation status thereof, and a critical understanding of their cataloguing, as well as the visibility of the works and creators that comprise the collections.

Keywords

Latin America, Archives, Video art

Introduction

In Latin America, video artworks have circulated broadly and achieved significant visibility in recent decades, and they are now part of private and museum collections. More than four decades of festivals, exhibitions at museums and cultural centers, and creative laboratories played a key role in the proliferation of video production and the dissemination of works throughout the region. The initial lack of interest in acquiring those works from all but a handful of museums, as well as the urgent need to organize the materials and prevent them from becoming technologically obsolete, led to the first video art archives in Latin America being established by independent festivals and initiatives. In many cases, video art archives have now achieved a certain degree of institutionalization, making it possible to develop original narratives and propose new histories. Recovering and recognizing the value of audiovisual materials that were often abandoned, in a precarious state of conservation, or unidentified has been crucial to the study of video art in Latin America. Those investigations, which inevitably involved digitization as well as methods to organize the information and catalog the material gathered, produced important online archival initiatives [1], critical essays and publications [2] that incorporate historical studies linked to the work of video artists, demonstrating just how imperative it is to have local video art archives.

Beyond the specific characteristics inherent to the local region, one must also consider the nature of video itself, a medium and technique that poses two significant challenges. First, the conservation of magnetic and digital formats has certain requirements that differentiate it from film; there are dozens of formats and codecs, which make it more fragile as the years pass. Second, audiovisual works are difficult to organize because archival systems were originally designed to catalog museum collections that primarily contained still images. Video thus inhabits spaces and problems that bring it closer to other audiovisual practices, such as experimental cinema and short films. These are some of the assumptions underpinning our research, which attempts to establish a preliminary mapping of the institutions, organizations, and personal initiatives associated with the preservation, cataloging, and dissemination of video artworks in Latin America. One of the greatest challenges was obtaining information from different sources and analyzing it with the goal of producing a systematic and comprehensive study of the various strategies developed in the region. This involved in-depth interviews, email correspondence, and surveys [3]. Based on the results obtained, we have identified four models that demonstrate the key organizational practices and strategies for preserving and disseminating video artworks in Latin America: video art festivals, museums and institutions, personal initiatives, and exhibitions based on archival research.

The archive as necessity and narrative: video art festivals

The Videobrasil festival was founded in 1983 by the Brazilian curator Solange Farkas. It has a collection of 14,000 magnetic tapes of which 1,400 are works of video art—1,100 by Latin American artists. Videobrasil's digitized collection, which contains twelve terabytes of data, includes the collections of renowned Brazilian artists such as Marina Abs, Rafael França, Rosângela Rennó, and Eder Santos. Ana Pato identifies three stages in the history of the Videobrasil archive. The first corresponds to the archive's creation in 1983 until 2001, decades during which it received a large amount of material as a result of the works submitted to the festival, making necessary a preservation plan for the works that had been collected. The second stage, between 2002 and 2007, involved the professional digitization and classification of the material, which led to the creation of Videobrasil online, a pioneering project with a complex system of information for works, documentation (including installation documentation of time-based media works), photographs, institutions, people (artists and curators), texts, essays, and publications [4]. In the third stage, the collection was disseminated through

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exhibitions, with the aim of developing new narratives via discussions and curatorial approaches, as a strategy to promote memory practices. A critique of the limitations of archival classification was the impetus for the 2017 exhibition *AGORA SOMOS TODXS NEGRXS?* (Are we all Blxck now?), which brought together the different generations of Black artists in the collection [5]. The Videobrasil archive does not have a category that identifies skin color or race, which led the exhibition's curator, Daniel Lima, to carry out an investigation that revealed the small number of artists of African descent represented in the collection. Another video art festival of note, the Festival Franco Latino Americano de Video Arte—first held as the Festival Franco-Chileno de Video Arte in Santiago, Chile (1981–92)—played an essential role in the region as a space for freedom of expression during the military dictatorship of Augusto Pinochet, expanding first to Buenos Aires, and then to Montevideo and Bogotá, until it ended in 1996. In 2015, thanks to Pascal- Emmanuel Gallet, the French government was able to donate digital copies of the works shown at the festival to the Museo Nacional de Bellas Artes in Santiago [6] and the Universidad Nacional de Tres de Febrero (UNTREF) in Buenos Aires, creating a valuable regional historical archive. Following the end of the Festival Franco-Chileno de Video Arte, the Chilean artist and academic Néstor Olhagaray founded the Corporación Chilena de Vídeo y Artes Electrónicas (CChV) [7], which established the Bienal de Video y Artes Mediales —now BAM— in 1993. CChV began collecting works when the biennial was created and now has around five hundred works in both magnetic tape and digital formats, of which four hundred are by Latin American artists. The Archivo Audiovisual de la CChV (AAV_CChV) has historical works from the early 1980s to 2007, as well as pieces submitted to the Juan Downey Video Award and a collection of expanded cinema works, which are essential to understanding the history and context of audiovisual art in Chile. CChV has also established the Mediateca Libre, a content repository for digital culture [8].

In Central America, unlike what occurred in South America, there has been a unifying phenomenon among the countries in the region, allowing the audiovisual production to be concentrated in a small number of institutions. Arguably the most significant is the Museo de Arte y Diseño Contemporáneo (MADC) [9] in San José, Costa Rica, which has eighty-five videos as part of its collection. The museum's Centro Regional de Documentación e Investigación (CRDIA) houses a video library that has been collecting materials since 1994 many of which are part of the *Inquieta imagen* (Restless image) competition and exhibition, which was conceived to encourage experimentation and to broaden knowledge about digital art production and video creation in Central America.

The archive in conversation: museums and institutions

Video was a vitally important medium for maintaining a critical and optimistic spirit in Latin America, particularly during the military dictatorships of the 1970s, when video served as an experimental instrument for liberation and memory and as a vehicle for international dissemination at a time when many artists were living in political exile. During those years, despite the complex political and social situation, some museums and institutions sought to promote the use of video through exhibitions and creative spaces. Nonetheless, videos were not all considered works of art under the museums' own conservation and cataloging systems.

In the 1970s, the Museu de Arte Contemporânea da Universidade de São Paulo (MAC USP) carried out a groundbreaking project in the region, initiated by its director, the Brazilian curator and art historian Walter Zanini. MAC USP facilitated an openness to new experimentation in the midst of the military dictatorship, which was a crucial factor in the creation of an audiovisual critical memory and the emergence of the first video works by Brazilian artists including Roberto Evangelista, Paulo Herkenhoff, and Letícia Parente. MAC USP has been digitizing and cataloging this important audiovisual collection, which is a landmark in the history of video creation in the region.

By the end of the 1960s, Buenos Aires was a key city for video and new media production. The Centro de Arte y Comunicación (CAYC), promoted video art through the Encuentros Internacionales Abiertos de Video (1974–78), circulating works by a new generation of Latin American artists, although many of those materials are now lost [10]. The first institutional collections of audiovisual works in Buenos Aires did not appear until the late 1980s: in 1989, the Instituto de Cooperación Iberoamericana (ICI) organized the exhibition *Buenos Aires Vídeo I,* curated by Carlos Trilnick. The ICI became the most significant institution for the dissemination and conservation of video art in Buenos Aires. The ICI was followed by the Museo de Arte Moderno de Buenos Aires, which, under the direction of Laura Buccelato (1997–2013), had a video collection based on the works that had been presented in that space and were donated by the artists. Some initiatives were halted upon the departure of their administrators, which set a precedent in terms of institutional sustainability and the inability to develop a consistent long-term project. This is also the case at the Museo Nacional de Bellas Artes (MNBA) in Buenos Aires, which in the 1990s, began acquiring video art for the collection; however, many of the works have not been yet cataloged.

Among Mexican museums, the Museo de Arte Carrillo Gil in Mexico City has one of the longest traditions in Latin America of collecting and exhibiting video and video installations. The museum has three hundred audiovisual works, of which approximately fifty are by Latin American artists. It also has historical works related to video, as well

as recent ones, many by artists who have participated in the museum's exhibitions or activities.

In Uruguay, the Centro Cultural de España (CCE) in Montevideo has an important archive of Ibero-American video art, which was begun in 1988 by the artist and curator Patricia Betancur and now has three hundred works.

In Santiago, Chile, the Centro de Documentación Artes Visuales at the Centro Cultural La Moneda (CCLM) has three hundred audiovisual recordings, both video art and performance, as well as television programs about the visual arts.

In Peru, Alta Tecnología Andina (ATA) and the Museo de Arte de Lima (MALI) in Peru have been developing the espacio-Plataforma de Preservación Audiovisual (ePPA), which seeks to preserve and disseminate the Peruvian audiovisual collections conserved and studied at both institutions by incorporating them into a database [11]. The MALI and ATA collections have more than two hundred works: most of the works at the MALI arrived through its acquisition program, while the works at the ATA come from co-production and creative projects carried out over more than two decades [12].

Finally, in Bolivia, the, Nicobis—Archivo Audiovisual de los Pueblos Indígenas is a center for communication in film, video, television, radio, and publishing. Founded in 1981, the Archivo was the first video production company in the city of La Paz, and it has operated continuously for more than thirty-six years, developing more than one hundred and fifty audiovisual productions, including documentaries, feature films, and cartoons, primarily focused on Indigenous peoples. Another institution in Bolivia, the Centro de Documentación de Artes y Literaturas (CEDOAL) at the Espacio Simón I Patiño, preserves and facilitates the public consultation of its collection of Bolivian video art through its online catalog [13], the outcome of rigorous research by the Bolivian artist Narda Fabiola Alvarado, who documented the history of video art in her country [13].

Sustained and unsustainable initiatives: the personal archive

The two models examined in the previous sections show that an import- ant impetus for the creation of video art collections comes directly from individuals who have led or established organizations to promote the creation and dissemination of video and experimental media art. In the cases presented in this section, the individual takes on a central role, through small personal endeavors that—in response to a lack of institutional support—assume responsibility for conservation, cataloging, and dissemination. Such endeavors become intertwined with the professional and artistic lives of the people behind the initiatives.

The Museo Centroamericano de Videoarte (MUCEVI) is a project by Antonieta Sibaja in San José, Costa Rica, which seeks to create a new form of visibility for video and sound artists in the Central American and Caribbean regions. MUCEVI was founded in 2010 and now has almost four hundred works in digital formats dating back to the 1990s,

when the production of video art began increasing in Central America. Along the same lines, the Argentine filmmaker Mariela Cantú founded Arca Video Argentino, an online archive and database that aims to highlight the work of artists and promote the conservation, dissemination, and exhibition of Argentine video art, facilitating public access to a valuable collection of artistic production. In 2019, Cantú received a creative grant from the Fondo Nacional de las Artes of the Ministry of Culture in Argentina to update the current platform and create an archive of Argentine experimental video, using a participatory approach [14].

The Asociación Archivo Nuevos Medios Ecuador (AANME) [16], established by María Belén Moncayo, is an example of an independent collection pursuing an institutional path. AANME was created in 2002, initially out of a closet in Moncayo's home in Quito.

Led by the filmmakers Ángela López and Guillermo Zabaleta, the Laboratorio de Cine FAC (Fundación de Arte Contemporáneo) in Montevideo has been operating since 1999 as an artists' collective and a laboratory. The collection includes one hundred and fifty works of Uruguayan experimental cinema since 1951 in both digital and film formats, developed through the Laboratorio de Cine FAC's efforts to restore the material. These "archivists" challenge institutional models. They serve as caretakers of a scattered cultural heritage, preserving it and giving it visibility, as well as supplementing that activity with initiatives such as workshops and spaces. In addition, while discussing those who have built independent collections, it is important to mention the work of Ximena Cuevas is one of the most prominent Mexican video artists working today and is an essential reference in Latin America. Her archive contains fifteen hundred works (a vast majority are Mexican, with seventy being from elsewhere in Latin America) and was created based on a passion for the language of the moving image. Cuevas was able to catalog and digitize this archive and organize an original historical timeline of Mexican video art.

Exhibitions as investigation: the expanded archive

The final model, which is becoming increasingly common for the establishment of audiovisual archives, is retrospective or historical exhibitions based on research and investigations into video materials that were widely dispersed or inaccessible. Four recent cases demonstrate this trend.

To commemorate the twenty-year anniversary of ATA, a research project was carried out in its archives, which made it possible to collect, analyze, and catalog materials for the exhibition *metadATA: 20 años de Cultura, Arte y Tecnología* (2016; metadATA: 20 years of culture, art, and technology) which included audiovisual material from the early years of ATA, the Festivales Internacionales de Video/Arte/Electrónica, the project Escuelab, as well as selected projects and collaborations with organizations and individuals. A video-on-demand (VoD) system was also

installed in a gallery, making nearly two hundred titles available to the visiting public.

The exhibition *Retro Visión Espectral: Aproximaciones a una historia del videoarte en Colombia* —curated by the French-Colombian artist and curator Gilles Charalambos and held at the Museo Monumento a los Héroes in Bogotá (2018) and the Museo de Antioquia [16] in Medellín (2019)— featured the most representative pieces by Colombian artists from 1973 to 2000 in the context of sound, electronic, and conceptual experimentation. The forty-two works in the exhibition, presented on household television sets from the eighties and nineties to evoke the atmosphere of the period when the works were created.

Under the coordination of Guillermo Zabaleta, the CCE in Montevideo presented the 2019 exhibition *Intersticios,* a visual-arts plat- form focused on the restoration, preservation, and exhibition of archives, documents, and research on artistic works and practices centered on he experimentalism of the 1950s, conceptualist poetics, and the rise of new media in the mid-1980s.

Conclusions

These four models allow us to identify several recurrent situations as well as working practices and occupational cultures in video archives in Latin America. One of the main findings is that many video art archives are still scattered; in addition, important preservation and dissemination initiatives operate under administrative models with precarious sustain- ability. Although video art has —perhaps belatedly— been incorporated into museum collections, there is still much work to be done in terms of recovering works and creators that have been abandoned, particularly those that emerged in the region in the final decades of the twentieth century. Institutional initiatives are still few and far between and have serious economic constraints that do not permit the much-needed organization and dissemination of the materials. Inadequate cataloging and a lack of access (particularly online) limit the possibilities for studying and circulating this valuable material.

As mentioned above, Videobrasil has carried out research and curatorial work that has revealed the problematic power relations of rigid cataloging structures. Ana Pato says that "I was extremely impressed... because I was able to see the relationship between power and memory... the role of archivists in the sense of a person's opinion." [17] This is echoed by Mariela Cantú, who calls for collaborative or open archival parameters: "There is space for a very significant exercise of power by the archivist, which can be somewhat problematic when you think about more open forms of archiving, and so there is this whole movement of participatory archives... if we are going to think about a community archive, for example, the community itself should catalog it, with criteria that are appropriate." [18]

A reflection on the abundance of alternative narratives that can be offered by video art archives is embedded in the independent efforts and initiatives that seek to collect and study the history of Latin American video art. These parainstitutional initiatives pursue alternative administrative models —grounded in collaboration— which make it possible to explore flexible classifications and cataloging models, encouraging speculation on potential new readings and histories. The existence of this type of initiative confirms the importance of and need for access to audiovisual archives and underscores the commitment of individuals to preserving their country's audiovisual memory. The precarious sustainability of many of these initiatives is an element of our incipient democracies, which we see portrayed in Latin American audiovisual history and which affect the critical development of audiences and publics in times when banal content fragmentation is encouraged and there is fierce competition for attention from multiple screens and mediums.

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[3] The information used to produce the essay was based on personal conversations, interviews, and data provided by the organizers of many of these projects, beginning in early 2019. In-depth interviews were conducted with Mariela Cantú, Ximena Cuevas, Jorge La Ferla, Ruy Luduvice, and Ana Pato. Eighteen responses were received to a survey that sought to gather basic information on different collections. In total, more than forty professionals were contacted and have contributed valuable information during the process, through correspondence and their survey responses.

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[17] Ana Pato, interview.

[18] Mariela Cantú, interview.

Author Biography

José-Carlos Mariátegui is a writer, curator, scholar and entrepreneur on culture, and technology. Dr. Mariátegui is the founder of Alta Tecnología Andina – ATA, an organization working at the intersection of art, science, technology and society in Latin America. His multidisciplinary research embraces media archaeology, digitization, archives and the impact of technology in memory institutions. He is a Lecturer at LUISS (Rome), Research Fellow at the Department of Media and Communications of the London School of Economics and Political Science, and a Board Member of Future Everything (UK). A former Board Member of the Museo de Arte de Lima - MALI (2013-2021), he chairs MALI's Education Committee, and leads the museum's digital strategy. Has published in journals such as *AI & Society, Third Text, The Information Society, Telos* and *Leonardo* and curated art and technology projects internationally for more than two decades. He recently co-edited a special issue for *AI & Society* on Cybernetics in Latin America.

Leaving our comfort zone. A proposal to co-create appropriation in Media Art Archives for their sustainable future

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Abstract

This article presents ideas, proposals and strategies to renew in a sustainable way the creative involvement and appropriation of the contents of online digital archives dedicated to media art. Under the premise of multilingual open access repositories, with the interaction in collaborative and co-creative networks, a training programme is presented in the context of the Anilla Cultural Latinoamérica-Europa in Uruguay, aimed at future teachers of primary and secondary education at the local level and the Spanish-speaking region. This initiative proposes keys that allow for the collaborative and co-creative expansion of teaching and research based on media art archives with a global perspective.

The article also proposes two ideas to be developed by ISEA Archives. These are: 1) to present a project to UNESCO to declare the ISEA Archives as a Digital World Heritage of Humanity, and 2) to study how the concept of "digital vellum" can be used to preserve the contents of the Connecting Archives project.

The proposal and the two ideas presented in the article are a step forward in quality and quantity to ensure a sustainable future for media art archives. Co-creativity and collaboration will be the main tools to achieve these goals.

Keywords

media art, teachers training, sustainability, archives, co-creation, world digital heritage, digital vellum,

Introduction

The training of future teachers is not always directly linked to areas of innovation, let alone new media arts. In general, teacher training in the arts (for children and adolescents) focuses on traditional areas. Specific teacher training in art and technology is rare, and even less is it focused on transdisciplinary perspectives in art, science, technology and society.

Another asymmetry that makes it difficult to learn about new media art - and its history or legacy - is that most of the archives and repositories are in English, making it difficult for other audiences, such as Spanish-speaking people who are not so influenced by the English language, to easily get to know this type of content.

Therefore, in the context of Anilla Cultural UY Latin America-Europe in Uruguay and its global networks (https://anillaculturaluruguay.net/), the International Training Programme "New Media for Teachers" 2020-22 (https://anillaculturaluruguay.net/programa-internacional-de-formacion-nuevos-medios-para-docentes-international-programme-new-media-for-teachers/) was announced in mid-2019. Anilla Cultural, born in 2007-08 in Catalonia and expanded from 2010 to Latin America (http://anillacultural.net/), is a network of co-creation and collaboration in art, science, technology and society through advanced internet, conceived as such in its founding the technological infrastructure as it mainly worked through telecommunications systems such as H323 that required a robust internet (known as advanced internet) and specific equipment for transmissions. Until 2019, this technological deployment continued to function, while at the same time other forms of video conferencing in web environments were gaining ground in terms of the number of users and platforms available.

The founding objective of the Anilla Cultural was to facilitate access to quality cultural content with global, regional and local references of new media art and to encourage the co-creation of different audiences for a contemporary cultural transformation.

The main objective of the International Training Programme "New Media for Teachers" was to raise awareness among teachers in Uruguay and the Spanish-speaking Ibero-American region (online participant audiences) about the importance of new media for educational work, with an emphasis on new media art. New media art was considered because it is a field of study that enables endless transdisciplinary connections with other fields of knowledge and also because it is a purely creative area, a fundamental aspect for innovative educational work.

From Anilla Cultural UY there were important antecedents of approaching online new media in general, for instance the Uruguay node founded in 2012 the Online Congress of Education and New Media, a biannual event that shares trends and key issues in the convergence of

education, innovation and technology. It was always approached from a transdisciplinary point of view where art, science, technology, digital humanities, virtual reality, among others, were the object of exchange and enrichment at local and regional level (https://anillaculturaluruguay.net/4o-congreso-internacional-de-educacion-y-nuevos-medios/). Also in Uruguay, due to the CEIBAL Plan (https://ceibal.edu.uy/en/) inspired by Negroponte's *one laptop per child* at MIT, all primary and secondary schools and teacher training have undergone a technologically mediated educational revolution since 2007. Thousands of children, teenagers and teachers have participated in the Anilla Cultural in Uruguay from their educational institutions (with H323 equipment, or via the web) as shown in this example of the 2nd online congress, entitled "*La Kamera en Red*" (https://issuu.com/anillaculturaluruguay/docs/reporte_anilla_uy_-_2do_congreso_20).

Therefore, when designing the training proposal for teachers (2020-22) focused on new media art, all these characteristic factors were taken into account as opportunities for educational and cultural improvement, for an audience (teachers) who are permanently actively participating in the activities and projects that are proposed online, where new media are interrelated with new media art. In this way, an open character of new media and inclusive at the same time with new media art was provided. One of the specific objectives of the training programme was to strengthen the Spanish language (because of the Spanish-speaking target audience) in interrelation with a broad multilingual approach, which allows access to a large amount of content that is in the English language. At the same time, the training programme showcased examples of new media art from Spanish-speaking creators as a platform for local, regional and global dissemination.

The pandemic period was out of the forecast in the initial planning for 2019, but this global drama, however, raised more interest than expected in these issues due to the massive immersion into the digital world and the consumption of all kinds of online content.

In May 2020, the training programme was launched to coincide with the 5th International Congress on Education and New Media, under the theme "New Media Heritage" (https://anillaculturaluruguay.net/5-congreso-internacional-online-de-educacion-y-nuevos-medios/). It aimed to "This base could be mentioned as its heritage such as the creative approach and its educational legacy. A heritage in transit, as its own transformation enables it to be a permanent novelty".(https://anillaculturaluruguay.net/wp-content/uploads/2020/05/ProgramaENG.pdf)

Therefore, new media art was considered as the main constituent of new media in its creative perspective and permanent novelty. Thanks to an initiative of expanded collaboration, it was possible to count on international referents who enriched the programme, the exchange and

the reflection of the two days of the congress with online attendees from the Latin American region, Europe and the United States. The list of institutions and individuals who participated in the two-year training programme is included at the end of this article.

The start of the training programme coinciding with the 5th edition of the online congress was stellar (with content in Spanish, English and Portuguese for simultaneous interpretation and for the dossier, programme and agenda) and was accompanied by significant online attendance on the video conference platform (more than 500 attendees over the two days of the congress) and more than three thousand views in total on the social networks where it was simultaneously broadcast, on YouTube and Facebook Live.

As well as showcasing the creations of leading figures in the media arts, the media itself allowed participants to perceive themselves as part of a global community and experience firsthand how online works as free and open access, sharing quality information, collaboration distributed online in real time, and local and global integration at the same time, among other positive perceptions that both attendees and speakers expressed during the event.

Development of Actions

The training programme, in its first edition 2020-22, was clearly divided by year, which in turn coincides with the academic years of the southern region of South America. And in each of them, specific actions were worked on for the target audience of local teacher training (specialising in Visual Communication), aimed at the primary and secondary educational stages in public education within the CFE, the Spanish acronym for the Council for Training in Education in Uruguay.

Throughout the three years, more than 250 teacher training students have participated (synchronously and asynchronously), actively and directly producing theoretical content and creative projects. At the same time, more than 350 students of the Visual Communication speciality have participated -from different parts of the country- in extension activities, either by attending online lectures or specific proposals. And more than 500 attendees (students and teachers from higher education institutions in different areas) from the Spanish-speaking region have participated in online activities synchronously. The total number of online attendees from the region was +500 and specifically +600 were teacher education students.

On the other hand, Figure 1 depicts the stages corresponding to each year, in terms of actions and main content guidelines that were focused on. In the year 2020, after the start, open classes produced from the curricular courses were continued.
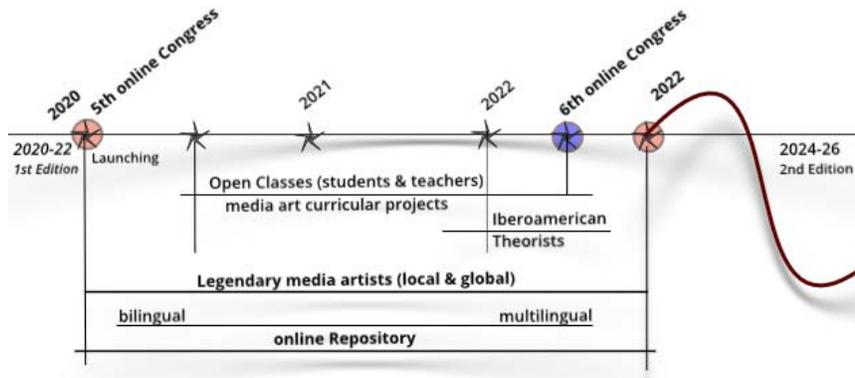
Figure 1. Contents Agenda 2020-22. ©CC BY 4.0

From there the students generated content creatively, produced theoretical essays linking the authors of the course and the contents of the congress together with theoretical materials related to the lectures. Thus, after the online congress, a master class was held by Prof. Shanken, giving a historical overview of the art of new media and its main current trends. Disseminating his digital book in Spanish (Shanken, 2014) and repository of digital archives of artists. In this activity the audience was already beginning to identify the contents and perceive that an online repository was being created (within the YouTube channel of Anilla Cultural UY) bilingual (Spanish and English) with the video conferences that were open access and free of charge with previous registration.

Then, in 2020, there was a very active participation of the students, which was facilitated by the pandemic and the partial or total confinement. The curricular courses ended with an "Online Party of Technologically Mediated Art Education" (https://bit.ly/3LdInLo), where teacher training students presented their theoretical projects and practical creations on new media art, for instance the DENMA Project, which is the acronym in Spanish of Aesthetic Drift for New Media Art. It is worth highlighting some students' proposals that interrelated specific languages such as net art, or other links with video art and media installations, etc. and theoretical and educational reflections. Generating authentic learning processes and appropriation of the contents of the online repository that was being built within the training programme, as well as the use of other local, regional and international platforms, repositories and archives dedicated to new media art. In this way, students began to make their first explorations of new media archives and to perceive the importance of their existence as a source of knowledge for preparing their own classes. In addition, as an outstanding contribution, several of the artists and theorists involved were online during the students' presentation - Roy Ascott, Vuk Cosic, Diana Domingues, Maurice Benayoun, Monika Fleischmann & Wolfgang Strauss, Graciela Taquini, Edward A. Shanken, among others - who made comments, criticisms, contributions and congratulations on the work they had done.

The training programme (in Spanish) was beginning to be perceived as the gateway and the way to move through content that until now was unfamiliar to them or that was not within the canon of content on what a future teacher "should know". Exploring between synchronous online digital archives of the training programme itself and other reference archives of new media art.

In 2021, the proposal continued with guest speakers (local and international) who, maintaining the specific theme of new media art, added other topics, such as first, second and third order cybernetics. For instance, topics such as cybernetics in Uruguay with the case of URUCIB (Ganón, 2019) and the Latin America region with David Maulen's contribution (https://shorturl.at/r0357) were also addressed. The format of open classes was maintained (in 2020 there were nine events) and the production of content by the students, which were mainly theoretical essays on the nature and creation of new media art.

Two highly symbolic events took place in the middle of the year when classes were running half face-to-face and half online. One of the events was the video conference from Japan with Yoichiro Kawaguchi entitled "His artistic life for a sustainable future" (https://bit.ly/3l3In62) and the other was the Declaration of educational and cultural institutional interest of the International Training Programme "New Media for Teachers" 2020-22, the latter issued by the Education Training Council of Uruguay. The declaration does not imply any special funding or support, but it meant for students and teachers a legitimisation of the contents of the programme. Although the participants of the training programme were very clear that the contents were of high quality and that they had had unique opportunities to dialogue directly with legendary new media artists on a global and local level, this declaration provided the symbolic endorsement that it is institutionally valued for their training and not only as experimental or innovative events.

The conference with Kawaguchi was in Japanese and,-as in other instances-, simultaneous interpretation into Spanish and English was provided. Kawaguchi's figure and proposal attracted a significant number of 120 online attendees, which brought together not only the Spanish-speaking world, but also the Japanese and English-speaking world, who participated very actively in the video conference platform.

In this multilingual symbiosis, the audience highlighted one aspect that was the interrelationship between art, science, technology and society, brought together in one artist. Adding to an ulterior aim of sustainability in life, which Kawaguchi's artistic legacy promotes. Usually, when a video conference is over, the attendees immediately disconnect, with very few remaining to continue talking or exchanging. In this case, once the event was over, a little more than a hundred people remained connected to comment on their impressions of the artist, the experience of the union between different cultures, and the value of the links between art, science and technology for teacher training. Even 40 minutes after the end of the talk, more than 60 attendees were still online, sharing and exchanging their perceptions.

For 2022, the emphasis was on offering the audience lectures by Ibero-American theorists and artists. The new media line was also continued with a series of three lectures on "McLuhan's Legacy" and the 6th edition of the international online congress "Education and New Media" was held with the theme "What have we learned since 2020?" focusing on a comprehensive look at new media and the art of new media in our academic lives after the pandemic.

At the end of the training programme in 2022, the highlight was the video lecture by Penesta Dika on "The Art of Herbert W. Franke", the figure of Franke as a pioneer in different fields and the realisation of multilingual interrelationships, the content of which is available with subtitles (non-automatic) in more than 20 languages.

The result is an online repository on new media art, multilingual and,-as a first experience-, balanced between artists, theorists and managers of new media art, at local level in Uruguay, in the Latin American region and with global referents. Much remains to be completed and improved, but the result is of high quality. Among the pending issues for 2023 are the pending invitations to leading figures in the field of new media art. And to complete a series of publications (multilingual) that accompany the contents of the online repository and that will complete a methodology of usability for future teachers. For instance, the "Pedagogical Notes" on open classes, the proceedings of the online congress and the "Guide handbook" of all the contents of the online repository are to be published on the Anilla Cultural UY and other contents on the YouTube platform as an e-Culture multilingual channel. (https://www.youtube.com/@AnillaCulturalUruguay)

A new design of the "New Media for Teachers 2024-26" training programme will also be disseminated, aligned with the digital skills for the 21st century such as: Communication, Creativity and Imagination, Collaboration, Information and data literacy, Digital content creation, Safety and Solving problems, Critical Thinking, Citizen consciousness, etc., (OECD, 2021), deep learning (Fullan & Langworthy, 2013) and the profile of the digital humanist (Fiormonte et al, 2015). Therefore, as a sustainability strategy, this training programme proposal (in its first edition) aims to bridge the English language gap, raise awareness and train audiences (future teachers) who will teach future generations in primary and secondary schools, who are the formative matrix of society. Because the "human factor" (Ronchi, 2022) is essential to keep in sight for e-Culture, e-Services, e-Government, etc., for a proper balance between multiple stakeholders, where social sciences and humanities must be in close cooperation and co-creation in the design of cyber-technologies. Within this electronic and digital ecosystem, the archives of media art are intimately connected.

Last but not least, in the analysis of the sustainable future archives and to contribute ideas and proposals to help the Connecting Archives project, it needs to remark the human factor related the appropriation factor as well, the Flusser thought and specially his quote "We shall survive in the memory of others" (Peternák, 2010), expressing the otherness and the technological mediation and its irreversible new things that it generates.

In this way, with this strategy presented on the training programme in cultural education and educational culture, the artistic, scientific and technological areas are positioned in a creative key in the classroom. And it provides transmedia artistic languages to future and current teachers in higher, secondary and primary education.

It establishes the New Media Art legacy contents in the main core for the formation of the future human skills. Considering that the legacy of New Media Art has much to contribute to the current digital skills (https://digital-skills-jobs.europa.eu/), so coveted as a fundamental requirement for the future working life. And therefore this legacy needs to be included in the primary and secondary educational stages in order to promote basic digital skills in people, indispensable for the so-called productive sector of society.

Future work on Media Art Archives

Although there were some examples during the training programme, we consider it an educational strategy to take advantage of and include in the training the legacy of "the process of constructing an innovative content management system containing 30 year's worth of data" (Mitchell & van der Plas, 2019). Therefore, we consider that the online repository of the training programme should interact with ISEA Archives.

The online repository of the training programme is a platform that helps to raise awareness of the knowledge of new media art for the training of future teachers. However, in order to continue to deepen access to quality media art content, it is essential to encourage appropriation with the media art archives.

As stated at the beginning of the article, we agree with the Liverpool Declaration that "Media Art research is still marginal...We face losing an art form that is a central part of our post-industrial digital culture". (https://www.mediaarthistory.org/declaration) And also that the International Media Art research needs a crusade of global organisation and collaboration to develop

collective projects.

For this reason, we propose to ISEA Archives a collaborative partnership to include in the next edition of the International Training Programme "New Media for Teachers 2024-26", a series of online lectures to train future teachers on the basis of two questions: what is a media art archives, and how to use media art archives? From the perspective of ISEA Archives (Mitchell et al, 2022). Therefore, in addition to knowing and being able to use media art archives, whether they are ADA or SIGGRAPH archives, as mentioned above, or even delving into the legacy of other archives such as CAS (Clark & Carroll, 2022), which were also presented in the training programme in 2020, this type of strategic alliance between Anilla Cultural UY and ISEA Archives makes it possible to link with other proposals that enrich didactic tools in STEAM, such as HYBRID, promoting critical and creative thinking (Lopes et al, 2022).

In relation to this initiative, another proposal to be launched at the same training conferences is to include a category in the e-Culture awards organised since 2018 by Anilla Cultural UY, with an Award for Pedagogical Innovation in e-Culture using the contents of ISEA Archives based on collaboration and co-creation, aimed at primary and secondary educational stages as the target audience. This e-Culture Award, which is a symbolic recognition granted by Anilla Cultural UY, will be open to global participation.

Ideas to help the Connecting Archives project

This section focuses on contributing two ideas to be developed by ISEA Archives: 1) to present a project to UNESCO to declare the ISEA Archives as a Digital World Heritage of Humanity, and 2) to study how the concept of "digital vellum" coined by Vinton Cerf, can be used to preserve the contents of the Connecting Archives project.

The first idea is then developed, that as mentioned by the ADA archives (https://mediaartresearch.org/index.php?id=165) there are in its archive "international artists of approx. 5.000 evaluated artists", which represents an immense number of artists around the world as digital cultural heritage. This enormous dimension can be seen in the SIGGRAPH world map (https://digitalartarchive.siggraph.org/map-view/) or in their list of SIGGRAPH Data Archives (https://digitalartarchive.siggraph.org/view-export-data/), to mention just some of the archives that make up Connecting Archives project.

According to UNESCO's postulates on the Digital Heritage Charter (https://unesdoc.unesco.org/ark:/48223/pf0000179529.page=2), the concepts of heritage and preservation appear for those digital objects that constitute the world's digital

culture. Both in the concepts of "digital heritage" (https://en.unesco.org/themes/information-preservation/digital-heritage/concept-digital-heritage) as well as in the concept of "digital preservation" (https://en.unesco.org/themes/information-preservation/digital-heritage/concept-digital-preservation), ISEA Archives has a profound basis for being considered as the world's digital cultural heritage of humanity. There are no mentions in the proceedings of the ISEA Archives Summit that UNESCO has recognised media art archives in this category or issued any distinction, as the numbers of artists and the quality of their productions are worth distinguishing. This deserved recognition could help to bridge the gap of "the problem remains that the ISEA archives are separate and unconnected to other affiliated organisations data collection" (Mitchell & van der Plas, 2019).

It is also necessary to add that it is a global digital cultural heritage at risk. To this end, reference is made to the words of Vinton Cerf, "If we don't move now, we risk losing all the data we've created in the 21st century". (https://www.businessinsider.com/vint-cerf-father-of-the-internet-warns-of-a-digital-dark-age-2015-2) Focusing on the problem of preserving digital archives in the future, Cerf proposes the solution through the concept of "digital vellum", capturing the digital environment of "the files we created are interpreted as music or images or text or video games or anything else can be reproduced in the distant future". In the technical presentation (https://nitrd.gov/nitrdgroups/images/4/48/DigitalVellumAndArchives.pdf) and explanatory video (https://youtu.be/0IabXOLdbAQ) made in 2016 at The Networking and Information Technology Research and Development (NITRD) Program of the US government, Cerf especially details the contribution of the "digital vellum" concept for archives and how to work with them from a technical point of view and the human challenges for research and collaborative and cooperative networking.

Conclusions

A proposal and two ideas were put forward as a contribution to ISEA Archives. The proposal consists of a collaborative and co-creative strategy to raise awareness among future teachers about the nature and use of ISEA archives in alliance with the International Training Programme "New Media for Teachers" for its second edition 2024-26. And on the other hand, two ideas are shared, one of them is to present to UNESCO a project to declare ISEA Archives as a World Digital Cultural Heritage of Humankind. And the other idea, linked to this, is to study and apply the concept of "digital vellum" to the Connecting Archives project as a way to preserve this digital cultural heritage of humanity.

In this way, preserving, researching and disseminating digital media art archives is positioned in a sustainable circuit between past, present and future.

It is also hoped that this presentation will give rise to other co-creation initiatives between the archives and the training programme for its future second edition.

This proposal is presented as an inclusive strategy without trying to invent the wheel, but rather serves and empowers an audience without access to the field and channels possibilities in different directions towards the multiple stakeholders of New Media Art Archives, whose interactions are based on academic and cultural collaboration.

At the same time, every archive has the task of conservation, research and should position the dissemination and appropriation of its archives on the same level of importance. In this way, the marginality of the field of new media art would take a step forward in the social value assigned to this vast field of creation.

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Looking Back on 10 Years of Expanded Animation Symposium: Organizing, Documenting and Archiving Together With Students

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Abstract

The Expanded Animation Symposium is an annual event at the media art festival Ars Electronica. Since 2013 the symposium has featured 200 experts (i.e., artists, researchers, cultural workers, and curators) in the expanded field of animation. The video and online documentation are essential because the conference focuses mainly on lectures, artistic presentations, and panel discussions. Such symposia on animation and media art are only possible through cooperation with different partners (e.g., festivals, institutions, and universities). In many cases, a big challenge is the low level of funding and restricted resources. In the case of the Expanded Animation Symposium, cooperation between Ars Electronica and the Department of Digital Media at the University of Applied Sciences Upper Austria and other partners enabled the production of such an event in the context of media education. Students attended relevant media production courses and were included in the organization of the symposium as equal partners. This article explains the various tasks of organizing, documenting, and archiving the symposium and shows how students successfully became part of this process over the last ten years.

Keywords

Expanded Animation, Symposium, Education, Digital Art, Media Art Histories, Archive

Introduction

This paper contributes to topic 1 of the third Summit on New Media Art Archiving, ISEA 2023: "Building on the results of Summit 1 & 2". We build upon the work done by Hagler in [7].

Organizing, documenting, and archiving symposia in media art poses a significant challenge. In contrast to scientific conferences, which usually invite artists, cultural workers, and researchers to submit articles, symposia do not call for papers and publish proceedings. Therefore, comprehensive documentation (i.e., video documentation of the presentations and panel discussions, online archive) is essential for events focusing on artistic presentations and panel discussions.

The COVID-19 pandemic has significantly boosted video streaming and documentation of symposia and conferences. Since then, many events have taken place online or in hybrid formats. A positive side-effect is that video streams can easily be archived on online video sharing and social

Figure 1: The opening of the Expanded Animation Symposium 2022 at Ars Electronica Center Linz. © Christoph Schaufler.

media platforms (e.g., YouTube, Twitch, or Vimeo). While conferences that are held purely online face several issues—many of them related to socialization and timezones [9]—the technical aspects have become easier to handle due to the experiences from the pandemic. Meanwhile, hybrid events that interweave real spaces with virtual ones (i.e., through streaming or in the metaverse) are still challenging to organize [2, 10, 8]. For a successful implementation of a symposium, from the idea to the archive, many areas of responsibility are involved (graphic design, social media, web, audio/video technology, streaming, animation/motion graphics, photography, and project management). All these are topics of media education.

Based on the *Expanded Animation* (EA) Symposium (Figure 1) [5], this article presents guidelines on organizing, documenting, and archiving a symposium with students as part of a media education program. This review of the ten editions of the events (2013 to 2022) shows how we established a format to involve students as volunteers. The article discusses various involvements and introduces the concept of the course *Event Production*.

The Beginnings

The EA Symposium began as a cooperative project between the University of Applied Sciences Upper Austria and Ars Electronica in 2013, inviting animation and media art experts

to talk about the less explored regions of computer animation. The goal was to bring students and international artists together at the Ars Electronica Festival.

As part of a student project, twelve students created a trailer for the first edition of the symposium in the summer semester of 2013 [4]. The students also designed posters, flyers, and a website based on the trailer, to advertise the symposium and have an initial approach to archiving the program and speakers. It soon turned out that the first edition was only possible with the support of the student volunteers.

Broadcasting—and therefore archiving—the first edition was done solely through video and streaming. We provided a video stream cooperating with a local TV broadcaster DORFTV [3]. The TV broadcaster provided professional video equipment and integrated the video documentation into its archive. At the same time, the video documentation was incorporated into the comprehensive Ars Electronica archive [1] and linked to the EA Symposium website [5]. Building on this fruitful collaboration between Ars Electronica, DORFTV, and our university, an accompanying free subject called *Event Production* was established in the curriculum to support the organization of the annual symposium. In this free subject, the students learned how to organize a symposium and worked with the organizers on various areas of responsibility (i.e., production, website, social media, video documentation, or streaming). On average, 15 to 25 students were involved, supervised by up to eight professors. Later, in the event of a curriculum change, the free subject *Event Production* became compulsory.

Development and Integration of Expanded Animation Event Production Into Education

The integration of the students from our media department was a central point in the development and conception of the EA Symposium series. On the one hand, to introduce students to the scientific examination of the extended subject area of animation and, on the other hand, to involve them in the organization, production, and archiving of the events.

From the beginning, the existing educational focus was used and implemented in the context of semester projects, such as trailer production or developing a website. In this context, the video documentation and archiving represent an extraordinary reversal. While the first symposium in 2013 at the *LENTOS Kunstmuseum* was still documented by the local, non-commercial television station DORFTV [3], this competence switched to the University of Applied Sciences Upper Austria as early as 2014 with the associated introduction of the elective *Event Production*. Audio/video productions and motion graphics were existing contents of the curriculum at that time. The subject of live production and the technical equipment required continued to form within the elective from 2014–2020. When participating in *Event Production*, students voluntarily join various teams and support the event at several production stages spread throughout the year. Figure 2 shows the symposium's typical production timeline.

From 2014 to 2020, we introduced the students to the live event implementation (stage technology, recording, broadcast) and the associated requirements (camera and sound
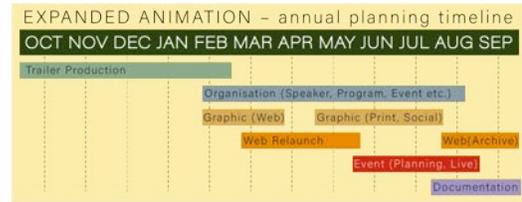
Figure 2: The timeline of an Expanded Animation Symposium production year. Production starts in October and finishes with the symposium in September of the following year. Big, independent tasks like the animated trailer or website are produced as a semester project by small groups of three to five students. Short, specific responsibilities by individual volunteers as part of the *Event Production* course © Christoph Schaufler.

Figure 3: Mobile direction unit at work. © Christoph Schaufler.

equipment, video switchers, graphic inserts, etc.) in extracurricular workshops. While we never struggled to motivate enough students to participate in this, making such workshops voluntarily adds a lot of uncertainty to the organization of an event. This circumstance, paired with the rise of streaming events during the COVID-19 pandemic and the ever-increasing production standards, led to embedding this content into an audio/video technology course with a curriculum revision. All students are thus familiar with the audio/video hardware and production pipeline, which widens the pool of potential volunteers for the symposium. Figures 3 and 4 show bachelor students working during the live event.

Archiving Methods

Since there are many parallel events during Ars Electronica, the video stream and archive are very important aspects of the EA Symposium. Interested festival visitors and students can watch the presentations at a later time. Furthermore, the archive is available for everybody interested in the topic. Archiving the symposium has mainly been driven by the budget of the event. Organized by a public university and only financially supported through sponsoring, it limits archiving to free systems with low to no running costs. This also means that there is no budget for developing a one-size-fits-all solution. Therefore, we rely on a wide range of platforms and

Figure 4: Students setting up camera equipment. © Patrick Proier.
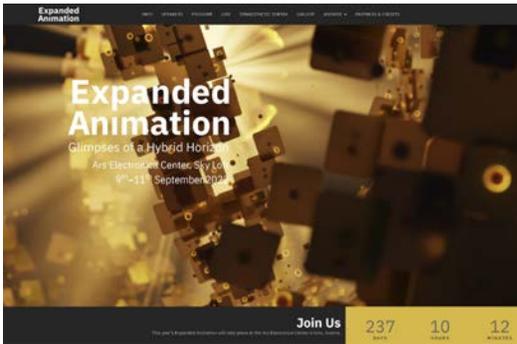
Figure 5: Landing page of the Expanded Animation webpage and hub for the symposium and archive. © Expanded Animation.

Figure 6: A part of the Artist section of Expanded Animation 2022's website. © Expanded Animation.
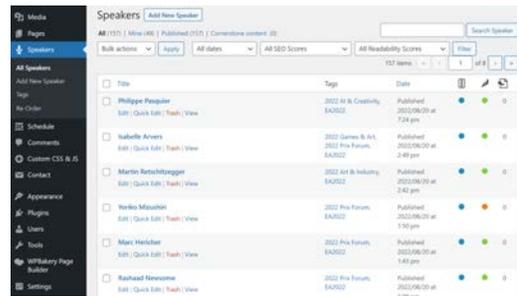
Figure 7: Speakers are managed in the backend and can be displayed where necessary. © Expanded Animation.

channels which have extended over the years. The EA Symposium website [5] (see Figure 5) acts as a central hub, which lists all panels and their presenters as an annual breakdown.

The Website

EA's website has been a self-created and self-hosted project from the very beginning. The first iteration was built using the free blogging and publishing platform WordPress [12]. Initially conceived as a one-time event, this made sense because WordPress sites can be set up quickly and easily. With additional editions of EA happening, the website had to be retrofitted to contain information about the past symposia. This was done by moving the main page to an archive/sub-page. After seven symposia and an organically grown archive that became hard to maintain, the website was rebuilt for the eighth edition in 2020. WordPress was once again chosen as a content-management system, but with the knowledge of seven symposia, many flaws of the first website could be avoided:

- The theme needs to be created specifically for a conference or event. Managing speakers and the schedules in the backend allows for structured storage of this data for archiving.

- The theme should also be able to handle multiple issues of a conference. While EA's current theme did not explicitly support this, it can usually be enabled through custom fields in WordPress and custom code additions to store issue-specific information.

- The number of potential plugins and third-party code should be kept low. As symposia might exist for many years, third-party software might not. Having to switch dependencies of a running system is usually difficult.

- Include a search functionality. The site needs to have proper search functionality to create a usable archive. WordPress includes a search functionality that covers an archive's basic needs.

With these considerations in mind, the new EA Symposium website was created. The old website's content was moved to the new one in 2021, and for every upcoming symposium, a new front page is created with new imagery and color schemes. The information about current speakers and the schedule gets inserted from the backend. Figure 6 shows a segment from the 2022 speaker's section. In one extensive collection, all speakers can be managed in the backend (see Figure 7). Filtering and assigning to different editions are done using tags. This way, double entries can be avoided, and speakers can be displayed multiple times when necessary.

This separation between data entry and storage through the backend and the mere display using the current theme in the frontend makes archiving efforts easy and pain-free. Students can easily support this workflow by entering new speakers and updating existing information without modifying the website theme. The website of the 2022 EA Symposium, as
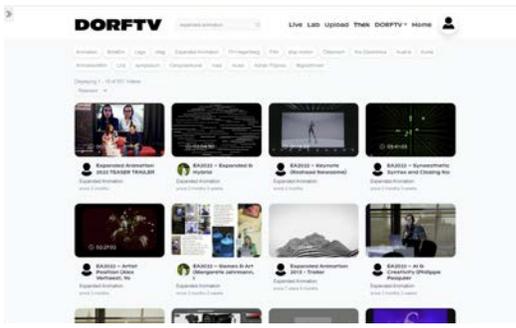
Figure 8: DORFTV's archive *Thek* [3] showing past editions of Expanded Animation. © DORFTV.
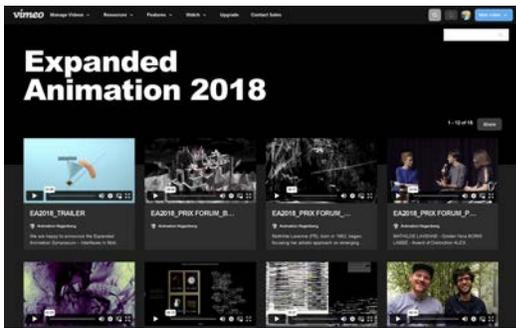
Figure 9: Expanded Animation 2018 as a collection on Vimeo. © Patrick Proier.

Figure 10: Live recording studio at the University of Applied Sciences Upper Austria, Hagenberg Campus. © Patrick Proier.
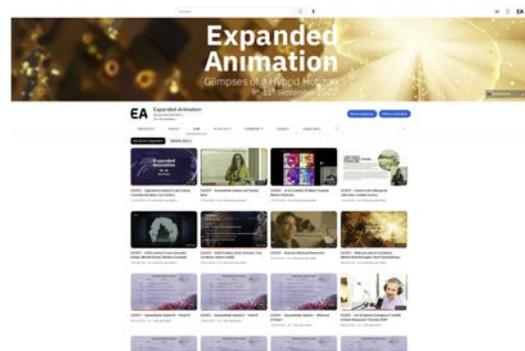
Figure 11: The Expanded Animation YouTube channel with streams from various sessions. © Expanded Animation.

well as entering data from previous editions, was managed primarily by a student team of three students.

Streaming and Archiving on Vimeo and YouTube

In 2013, we started a cooperation with DORFTV [3]. The local TV broadcaster supported the EA Symposium for the first two years by recording the event and broadcasting it a few times throughout the year on their channel. In 2014, we started to document the event with our technical equipment and the support of some students. To ensure contact with the local media, art, and culture community, we still share our content with DORFTV. Since 2015 all the symposium's talks have been available at the TV broadcaster's media archive *Thek* [3] (see Figure 8).

Until 2019 the recordings can also be found as collections under *Animation Hagenberg* on the video platform *Vimeo* [11] (see Figure 9) to make the talks accessible to an international audience from related subject areas. The downsides of Vimeo collections are the yearly costs, the limited upload of 20 GB per month, and the general visibility. Finding specific topics is too inconvenient on Vimeo, so we switched our video archive to YouTube.

From 2013 to 2019, we recorded the video streams of our three cameras on hard disks. A small team of students cut, tweaked, and rendered each talk individually before we could upload them to our media channels. During the pandemic, we had to rethink this concept and switched to a hybrid approach for the symposium. Therefore, we created a live recording

studio at our university (see Figure 10) and switched to the more streaming-friendly platform YouTube [6] (Figure 11).

Live-streaming on YouTube gave us new ways to communicate with our online audience and made the whole post-production workflow of the past years obsolete. Today we record the symposium only for safety reasons on hard disks while streaming directly to YouTube. DORFTV and the Ars Electronica *Talks and Lectures* archive [1] additionally provides those streamed videos for online replay.

Discussion and Conclusion

Organizing and conducting a hybrid symposium in media art in an educational context opens up many spheres of activity. Integrating students into this process is a mutually beneficial act. First, students gain insight into the organization of an international, multi-day event in their field of studies. They can practically apply their knowledge from studying in a real-world scenario, and the large scope of duties allows for considering their strengths and preferences.

Second, the organizers—in this case, professors and lecturers from our university—have a steady pool of possible volunteers that make organizing such an event even possible. Integrating the skills of event production into the curriculum ensures that each year a definite number of students have the skills necessary to support the event organization and conduc-

tion. Since students know their way around the technology and tasks involved, they are more likely to volunteer.

This results in an ideal educational scenario where students work at eye level with lecturers on event production and apply newly acquired knowledge directly to a real-world project. Many have been on the team for several years, continuously developing the EA Symposium product and passing their learned skills onto new colleagues from lower semesters. The students benefit in two ways: by learning by doing and gaining insight into current positions in the expanded field of animation.

Choosing technologies and platforms that are widespread and well-known (YouTube streaming, WordPress, etc.) works well for archiving on a semi-professional level. While a tailored archive with proper search functionality, such as the Ars Electronica Archive [1], is definitely recommendable and desirable, it is not affordable in any way for smaller events. Using the symposium website for archiving purposes is a good start. The biggest deficit is the lack of proper search functionality that moves beyond WordPress' search. While this can be added through plugins, these usually involve monthly usage fees.

Students, however, benefit more from the usage of well-known systems than from a tailored approach. They can, for example, use their preexisting knowledge to support the efforts and need less introduction. In our case, the students supporting the website and web archive were already familiar with WordPress. They can also further use their gained experiences in their future professional careers.

Looking back at ten years of Expanded Animation, we concluded that including students in the organization of the symposium has been a fruitful and rewarding experience that we can only recommend.

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Always on the lookout for the good tone, *Christoph Schaufler* moves between music production, sound design, and audio post-production for film, animation, and games as a recording and mixing sound engineer. As a long-standing assistant professor in the Media Technology and Design and Digital Arts programs at the Hagenberg campus, the transfer of knowledge and conception of up-to-date course content plays a major role in his everyday professional life.

Preserving a Hardware-Dependent Digital Artwork: Investigating Disk Imaging and Emulation Strategies

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Abstract

This paper summarizes the efforts and findings of a collaborative case study undertaken by a team of digital preservation and conservation staff to preserve legacy Apple hardware included as part of an accessioned artwork Yale University Art Gallery. Intended to test the capabilities of the EaaSI (Emulation-as-a-Service Infrastructure) framework for assessment and exhibition of digital art, a number of specific technical and logistic hurdles in pursuing emulation raised challenges for long-term preservation workflows involving unique hardware.

Keywords

Emulation, disk imaging, software preservation, hardware preservation, animation, media arts preservation, EaaSI

Introduction

In the summer of 2021, digital preservation staff from a Yale University Library (YUL) and a conservator from the Yale University Art Gallery (YUAG) selected *Tree Turbine* (2007), an artwork by Joseph Smolinski, from the gallery's collections as a case study for artwork assessment and access via emulation technology in a museum context. The artwork, an animated short video intended for exhibition, included mid-2000s era-specific hardware components and software applications, both of which required long-term preservation actions and planning in order to make future exhibition feasible.

Emulation, a technology tool and practice that has been used in preservation and conservation contexts for years, is still a strategy that is considered emerging or experimental in many preservation and conservation departments across cultural heritage institutions. In "The Australian Emulation Network: Accessing Born Digital Cultural Collections", presented at the Second Summit on New Media Art Archiving, Melanie Swalwell described growing community efforts to take advantage of emulation's potential by bringing together a group of practitioners and collecting organizations, all using the same remotely-accessible emulation platform, EaaSI (Emulation-as-a-Service Infrastructure). [1] This paper builds on those efforts by focusing on a case study to practically implement the same collaborative, web-based emulation framework described by that previous paper in the context of assessing and preserving a particular piece of digital artwork. The selected case study was an opportunity to test real-world implementation of emulation and the EaaSI platform at Yale - the host organization for a U.S.-based network of academic and museum partners (currently funded by the Mellon and Sloan Foundations) equivalent to the "AusEaaSI" group. [2] The collaborators on the *Tree Turbine* project anticipated the need to be adaptive in their work, documenting their processes and remaining open to alternative strategies when roadblocks were encountered.

Surprisingly, prior to reaching a stage when emulation would be incorporated into the process, the team realized that their regular processes for disk imaging or reformatting legacy storage media would also require alternative strategies from their typical workflows due to the conservation requirements for the artwork. In addition, the challenges encountered during emulation experimentation uncovered unique legacy hardware issues that had not yet been seen in previous EaaSI use cases. This required adapting typical preservation and conservation workflows for born-digital objects -- specifically, born-digital artworks with both hardware and software components -- from start to finish.

The following paper documents the case study, which includes disk imaging of the artwork and investigating emulation as an assessment and exhibition strategy, along with context for the artwork from the gallery's collection. While the actions taken by the *Tree Turbine* preservation team fell within the overall scope of a standard digital preservation workflow, it diverged in ways that opened new avenues for the study of preserving born-digital artworks in a way that preserves the era-specific integrity of these works so they can be experienced by the public for years to come.

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Artwork Background

Joseph Smolinski's *Tree Turbine* is a high-definition digital animation video artwork. Created in 2007, the artwork is part of a series Smolinski created around the concept of what humankind's potential biotech future might look like. Smolinski began "working with the imagery of cellular communication towers disguised as trees," thinking about how to use the aesthetic of the common cell tower tree to build, as he describes it, "a spinning tree turbine that would generate usable electricity and camouflage into the landscape." [3] *Tree Turbine* is Smolinski's first envisioning of this functioning electric wind turbine, created as an animated concept video for a 20-foot tall "tree turbine" prototype Smolinski later built in 2008 as part of an exhibition at the Massachusetts Museum of Contemporary Art, United States.

Tree Turbine was created during a period in which Smolinski was beginning to explore how to translate his work into different mediums, including the use of 3D animation. 3D animation has since become a part of his regular artistic practice. [4] Joseph Smolinski is a multidisciplinary artist and educator based in New Haven, Connecticut. Through his artist practice, Smolinski questions "the shifting roles of technology within communication networks, energy and oil companies, and the industrial agricultural infrastructure, which indelibly shape the so-called natural environment." [5]

The digital animation runs on a 3 minutes 40 second loop, depicting a series of power-generating wind turbines in the form of fake pine trees that slowly spin in the wind as the animation moves through various scenes where the turbines are installed and generating power, including a suburban neighborhood, a landfill, a cabin, a roadside electric car charging station, and a view of the Los Angeles skyline. [6]

As a physical artwork, the core components of *Tree Turbine* consist of an H.264 .MOV digital video file stored on a 2006 Mac Mini computer. The Mac Mini is connected to a modified Apple 23-inch cinema display monitor, dating from between 2004 and 2008, that displays and plays the digital file, in past exhibitions using the Apple Quicktime application as the playback method. A dedicated mouse and keyboard was used to control the computer and monitor.

Process

Various qualities of the artwork required a multifaceted approach to preservation that protected the integrity of the current, functionally accessible piece, and also considered what future access, beyond the lifespan of the physical object, would include.

The integrated nature of the artwork, encompassing both the digital file of the animation and the playback environment (including the software, operating system, and computer hardware), presented various challenges.

Challenges

The requirement to maintain the physical integrity of the artwork precluded what would have been the library team's normal practice of removing the hard disk and imaging it using a write blocker while cloning the data.

Replicating the digital file of the animation fell short of preserving the full object, including playback software and operating environment. In addition, any attempt to duplicate the file from within the operating environment used for exhibition could result in unintended changes to the data or supporting environment.

Future access to the artwork as result of these preservation actions should be as close as possible to the original exhibition.

Disk Imaging

To strictly maintain the physical integrity of the host system while preserving the work, we devised a process using a Linux-based LiveCD to operate the original hardware to create a full copy of the internal disk to an external hard drive.

A LiveCD is a type of operating system that runs in read-only mode from a CD or DVD via the internal optical disc drive. All data generated during the session is held in system RAM and is flushed on power-down, protecting the internal disk from modification. [7] For compatibility with the specific computing hardware, the ubuntu-13.04-desktop-amd64+mac LiveCD was used to operate the Mac Mini. [8]

Once the LiveCD system was booted, the "lshw" command line utility was run to document the internal hardware components and provide details about the hard disk including, the size, partition listing, serial number, and disk UUID. [9] Next, a secondary external hard drive was attached via USB and mounted to serve as the destination for the image of the internal disk. As destination for the clone, the secondary hard drive needed to be reformatted to a filesystem, both compatible with the decade-old operating system chosen for our LiveCD and able to support file sizes large enough to store our intended disk image file. The ext4 filesystem, commonly used by Linux-based operating systems, satisfied both requirements. [10]

For capturing the highest fidelity copy of the work, the method of block-level copying was chosen to create a bit-stream duplicate of the internal disk. An imaging process of this type accesses all sectors of the source disk and replicates every block to a destination disk or file. During this operation, the source disk remains unmounted, negating the risk of any changes or new data being written to the source disk. The output of a block-level copy at the device level captures all sectors on the physical disk, including unused or previously used space, and all partitions regardless of what is visible to the host system performing the imaging.

This type of image is viable for use in various methods of long-term access. The full image can be dumped back onto a new physical hard disk, enabling a replacement drive to be used in the original hardware. The image can be mounted from a modern host system to gain file-level access to the disk image contents. Using a compatible emulator, the image can also be booted in a virtual, emulated computing environment configured to mimic the original hardware.

The "dd" command line utility was used to perform the block-level copy of the internal disk to the destination drive. The command takes the source and destination as parameters, along with options that specify block-size and conversion behavior. To safe-guard against accidental write to the source drive, output from the following command line utilities were evaluated to verify the device names, locations, and status of each drive: "fdisk" for reporting sector size, disk identifiers, and device path and "df" to verify the source drive had not been mounted before imaging. [11, 12]

After verifying our invocation, the dd command was run with the "conv=noerror,sync" option. These set error handling parameters in the case that any disk sector returns a read error. The "noerror" option instructs dd to advance to the next sector and keep imaging; sync instructs dd to pad a read error sector in the destination copy, keeping the sequence of data in the copy readable. [13] In this case, producing an image that captures read errors, should they exist, allows the maximum amount of data to be cloned. It is also possible that the error is returned when reading an empty sector, thus no data is lost despite the error.

Executing the dd command cloned 80026361856 bytes (80 GB) in 3328.56 seconds, at a rate 24.0 MB/s, producing our block-level copy of the internal disk.

With the cloning of the internal disk complete, we proceeded to verify the integrity of our clone and establish a hash value to be used in future verifications. The first step included creating a checksum of the source data by using the md5sum utility to compute a hash value for the internal disk drive. [14] Next, a checksum of our disk image file was computed using the same md5sum utility, before comparing the values from each, finding identical output. The checksum value has been stored alongside the image file and will be used to verify the integrity of the image file following moves between different systems and storage locations.

After confirming a bit-perfect copy of the disk contents, we performed verification of content access by mounting the image on a modern Linux system to access and copy individual files from the disk image. This proved the viability of the cloned disk, specifically the ability to mount the file system of the imaged partitions from an external system to access the original files.

Emulation

The open source emulator QEMU was selected for attempting to run the Mac Mini disk image in emulation, as it is currently the only emulator both compatible with the EaaSI framework and capable of running Intel x86-based systems similar to the Mac Mini (to the team's knowledge, no open source emulator is available to specifically recreate a 2006 Mac Mini). [15]

Working directly with the block-level raw disk image presented challenges for experimenting and testing the disk image in emulation. Sharing an 80 GB file between remote team members and systems (like EaaSI) would require lengthy upload/download times given bandwidth limitations, and create an unnecessary strain on EaaSI computing resources.

To mitigate these concerns, we used the QEMU project's disk image utility ("qemu-img") to create a sparsified and losslessly compressed copy of the raw disk image in the QCOW2 disk image format (essentially to serve as an "access copy" of the block-level disk image for sharing and access). Sparsification detects unassigned memory in the source disk image's file system, allowing the access disk image copy to only take up as much storage space on the host system (e.g. digital preservation workstation or EaaSI server) as is actually used by system and user data in the guest system/disk image; further lossless compression (using the zlib library) shrinks the size of the access disk image even more while still allowing it to be uncompressed on-the-fly when run in QEMU. [16]

The exact command used was:

$ qemu-img convert -O qcow2 -c *raw_disk_image.img access_disk_image.qcow2*

This resulted in an access disk image sized only approximately 14 GB to the original, raw disk image's 80 GB. The conversion was also reversed and verified against

the original, raw disk image, again using md5sum, to ensure the qemu-img compression was indeed lossless.

Unfortunately, from there, attempts to run the access disk image on a local workstation using QEMU stalled almost immediately. Though QEMU can nominally emulate the same Intel x86 processor architecture used by the Mac Mini, the specific version of Mac OSX installed on the Mac Mini - 10.4 - used a unique method for fetching processor information during the operating system boot process. [17] This method checked for, and expected, defined responses unique to the particular CPUs used by Apple on their hardware, and none of QEMU's emulated processors (neither its generic x86 emulator, nor a number of specific emulated CPU models) appear capable of returning the required response. In other words, the operating system realizes it is not running on real Mac Mini hardware and refuses to boot.

After much further experimentation, the only path found to run the access disk image in QEMU was to obtain installation media for the Intel x86 version of Mac OSX 10.6 - a later version that does not have the same specific processor checks built into its kernel - which could successfully boot in QEMU and be used to update the operating system on the access disk image from 10.4.10 to 10.6. [18] On subsequent attempts QEMU could then boot the updated access disk image and allow exploration and assessment (using QEMU's "snapshot" mode to avoid any further user alterations, accidental or otherwise). [19]

Though this path marginally moved experimentation forward, options for further assessment or access remained limited. Even booting Mac OSX 10.6 requires use of a custom bootloader not included in default/common distributions of QEMU. [20] Though this bootloader could be acquired and used on a local workstation, it is not currently available in the EaaSI framework, making it pointless at this point to attempt to upload, run, or share the updated access disk image in EaaSI. [21] And while initial evaluation made it appear that no meaningful user data was changed during the process of upgrading the operating system from 10.4.10 to 10.6 (the system's user/registration information, Applications folder, and general file hierarchy appeared to remain unaltered), the status of the original Mac Mini as an accessioned artwork once again called into question whether the OS changes performed would be deemed too significant by the artist, curators, or scholars.

Logistics - a limited amount of time available to further pursue the case study; distributed team members; restricted/limited access to physical space; and the inability to run the emulation remotely in EaaSI - prevented a side-by-side comparison of the access disk image emulated

in OSX 10.6 in QEMU against the original hardware within the scope of this case study.

Conclusion

Over the course of this case study, the *Tree Turbine* preservation team encountered a range of challenges and insights related to digital preservation practice within a time-based media art conservation context. Primary takeaways from the work conducted included:

- Legacy Apple hardware presents unique, often highly specific challenges to both digital preservation best practices and long-term access, exhibition, and assessment.
- Working with era-appropriate tools required to operate legacy hardware requires finding documentation of technical limitations present in utilities, tools, and systems from their date of release.
- Pathways toward professional development are needed for staff to gain this technical, historical knowledge, and have the ability to apply it in practice.
- Collaboration between units and staff with varied expertise can help reduce the amount of redundant, siloed knowledge.
- Departmental policies and standards are needed in order to document these esoteric requirements in assessments, acquisition records, catalogs, and other areas where critical documentation is compiled.

Some of the challenges encountered were anticipated or have documented precedents. The need to disk image a hard drive while maintaining the physical integrity of the host system, for example, was a challenge that was unusual for a library digital preservation department, but standard within a museum context with time-based media collections where art works might include functional hardware as part of an art object. In that regard, the work conducted on *Tree Turbine* allowed the university library team to expand its disk imaging practices, and the university art gallery to refine its policies regarding the care of born-digital art works.

Still, some of the encountered challenges presented new, as-yet unresolved issues that will require further study, testing, and documentation. The challenges uncovered by experimentation with emulation technology and the EaaSI framework demonstrated the need for specific technical

and computing knowledge, the need for different units and staff to collaborate in service of sharing that knowledge and applying it within the boundaries of departmental policies and standards, and the capacity to expand existing digital preservation best practices in service of long-term access, exhibition, and assessment of born-digital artworks. Ultimately though, we hope further case studies and efforts in collaborative emulation services will foster Melanie Swalwell's vision for "A Community of Practice [that] will build confidence in the GLAM sector around born digital collecting." [22]

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Copy-It-Right
The Distribution Religion:
The Media Archaeology of the Sandin Image Processor

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Abstract

How do artists store and organize hardware and software? I investigate the analog Sandin Image Processor hardware using "zombie media" archaeology, examining the concept of "obsolete" or "dead" media to find sustainable, socially equitable art and design solutions by remaking hardware modules as software. Because Sandin shared the *Copy-It-Right: The Distribution Religion* manual, more than 20 copies of the IP were made. As a testament to the success of the IP community's engagement and maintenance, the machines continue to operate through the care of artists who actively engage the tool for new projects. Sandin's IP proposes preservation through replication, re-implementation, open-access archives/storage, DIY activities, and community Build-It/Fix-it parties. It represents an artist self-archiving and organizing resources to copy-it-right.

Keywords

zombie media archaeology; open-source history; video synthesizer; archive; digital cultural heritage; new media art; global archiving network; ISEA, Summit on New Media Archiving

Introduction

Pioneering computer models such as Dan Sandin's Image Processor (IP) (1969–73) (figures 1 and 2) give users agency and expose the invisible labor behind the mysterious inner workings—the black box—of image processing and new media art archiving. Bruce Latour uses the term "black box" to describe the obfuscation of time, labor, and materials:

> Look around the room. . . . Consider how many black boxes there are in the room. Open the black boxes; examine the assemblies inside. Each of the parts inside the black box is itself a black box full of parts. If any part were to break, how many humans would immediately materialize around each? How far back in time, away in space, should we retrace our steps to

follow all those silent entities that contribute peacefully to your reading this chapter at your desk?[1]

In 2021, I began to research the Sandin IP and set out to explore the possibilities of carrying on the spirit and ethos of this earlier era by reconstructing the analog hardware as digital software—to open the black box of image processing by tracing the genealogy of the analog image-processing techniques. Multiple Sandin IPs are still active in private and public collections; artist Amy Karle, the School of the Art Institute of Chicago and Alfred University maintain their own living IPs. To create my own living IP requires a further step: a transformation to an open-source zombie media vessel.

Figure 1. Dan Sandin, *5 Minute Romp thru the IP* (1973). This DIY video introduced his Sandin IP and its capabilities to process a live video in real time. Video still 5:58 min. ©Dan Sandin

From the point of view of new media art archiving methodology, the Sandin IP offers a case study to find solutions for new media art archiving. This case study may be one of the strategies to overcome the existing archival challenge. Multiple video synthesizers survive and thrive because of the *Distribution Religion* vision Sandin employed centered on human interconnection and low- or no-cost activities: community as a "resource," open-source sharing of intellectual property, artists' self-archive, and DIY activities. Terry Wong's article "Global Archiving

Network: A Case Study at the Second Summit on New Media Art Archiving at ISEA 2022," states:

> New media art is a contemporary-art category in which the media itself is very technology-dependent. Artists often incorporate emerging technologies in their artworks and constantly redefine the category. Unlike many other more static traditional art media, this evolving genre of art faces a severe problem: many recently created artworks can no longer be exhibited and may disappear without a trace due to technology obsolescence, lack of data, and insufficient documentation.[2]

Defying obsolescence, Sandin's IP remains active after 50 years. Researching and replicating Sandin's HIGH TEK synthesizer led me to the black box keys of zombie media archaeology. *How do artists store and organize hardware and software?* Or how can a culture build lifespan into a model with a vision wider than that of profit? To envision the infrastructure for a new media art archive requires looking at sustainable designs and art. The example of the analog IP provides a confusing challenge: how to preserve a video instrument, a high-technology invention with intricate parts and purposes. In attempting to remake the analog hardware as digital software, I learned that Sandin's IP synthesizer lives on its users. Sandin emphasized community as the main energy "resource." The relationships formed foster a culture of support for high-technology, nonhuman machines that require the delicate human hand and creative mind to survive.

What is old or new? What is original or a copy? Who or what is the average type or deviant? Foucault in *The Archeology of Knowledge* (1969) states that these dualisms, old–new, original–copy, average–deviant, become a value judgment. In listening to Foucault's appeal to reevaluate binary differences, *Zombie Media* conceptually stems from media archaeology, a new materialist approach for investigating technology. Hertz and Parikka state that zombie media "is concerned with media that is not only out of use, but resurrected to new uses, contexts and adaptations."[3] My methodology investigates the analog Sandin IP (IP) using "zombie media" archaeology to examine the concept of "obsolete" or "dead" media to find sustainable, socially equitable art and design solutions. As an artist remaking the hardware modules as software 50 years later, I believe the process could open artistic possibilities and bend history. Hertz and Parikka describe how "assembled into new constructions, such materials and ideas become zombies that carry with them histories but are also reminders of the nonhuman temporalities involved in technical media."[4] Media and memory are interchangeable in that the ideas need a vessel for storage and transfer. Silicon Valley corporate software companies now start by building a community of users, gaining the user's contact information, and beginning a relationship of communication. They set up a system in which the user is relevant and central, but in contrast to the

Sandin IP, with its community Build-It and Fix-it parties and the subsequent open-source model, they do not give the user agency with the product they have purchased. The open-source model of sharing and building community can become the common model for challenging the communication systems that now dominate. New media artists and archivists can benefit from the advice Sandin gave me in a Zoom interview titled "Property Rites"; held to discuss the IP.

> In that community-building adventure, [we] have this "copy-it-right" idea that rather than trying to prevent people from copying your stuff the best strategy was to let them copy it and distribute it…expand its reach.[5]
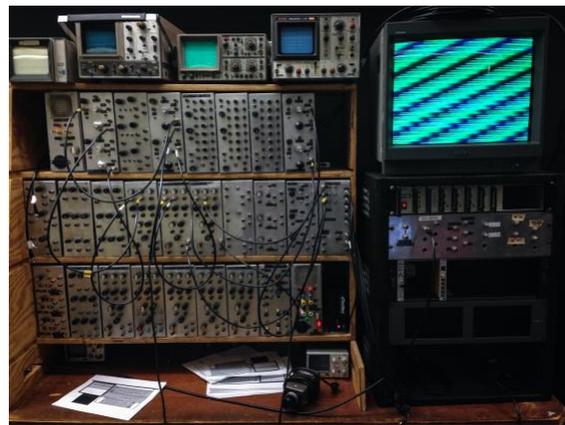
Figure 2. Dan Sandin's IP (1971–73). Note that the cables act as "patches" between the modular analog computers that process the video signal. Photo by Rosa Menkman, taken April 3, 2015, at the School of the Art Institute of Chicago, where the IP operates to this day. ©Wikipedia.
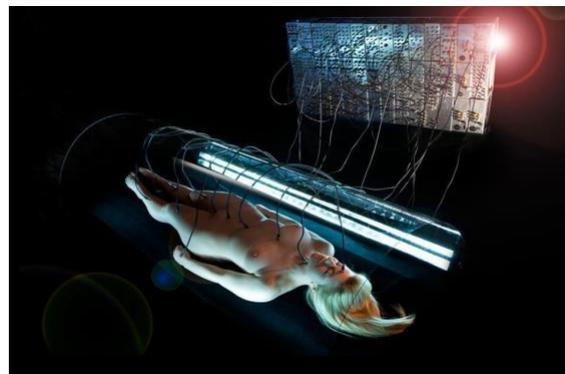
Figure 3. Amy Karle, *BioFeedback* (2011) performance, video art. Installation view at Detroit Institute of the Arts. A zombie resurrection for the Sandin IP with the artist Amy Karle performing and repurposing the Sandin IP. She maintains and operates her own IP which was formerly artist Bob Synder's from Chicago. Photo by Andre LaRoche. ©Amy Karle.

Do-It-Yourself

The IP, as Sandin explains in the live-recorded 1973 analog video *5 Minute Romp thru the IP*, "is a general-purpose analog computer, a general-purpose patch programmable [computer], meaning [a] program [made] by patch cables."[6] Sandin demonstrates the IP modules in real time to the viewers, embodying a DIY spirit of how they, too, can build a computer to process their moving images. The IP manual, with the title and manifesto of the *Distribution Religion*, details how Sandin's project was simultaneously an artistic, an engineering, a philosophical and a political project designed to broaden access to, interest in, and understanding of image processing. Currently, the implications are reaching out more broadly to new media art archiving. When this DIY approach is applied now, it challenges the obfuscation about artworks for replication and archival purposes.

Open-Source—The Distribution Religion

When video emerged as a medium in the late 1960s, Sandin created the IP, a video synthesizer with analog computer modules known as "open-source hardware." He designed its modules to be replicated by other artists as a way of building community and disrupting the network of communications under corporate control. As he explains, "I wanted people to copy [the IP] because I figured that was a better distribution mechanism than me trying to create a company, which I was not interested in doing."[7] The IP, despite the name, was not intended to process still images; Sandin's concept was always for the IP to be a video instrument in real time. With the arrival of the Portapak video camera in the late 1960s, image processing opened the floodgates of utopian thought and potential for analog video technology.

An activist against the Vietnam War, Sandin was in graduate school studying nuclear physics in 1968 when he saw Scott Bartlett's experimental film *OffOn*, of the same year, which uses video processing. Deeply inspired, Sandin built the IP in the subsequent five years. As the manager of a particle accelerator, he operated wall-size general-purpose analog computers. Applying the physics of the particle accelerator technology to video required a prophetic conceptual leap, collaboration, and commitment. Sandin explained to me, in our interview, that he discussed wanting a very powerful device for manipulating images with fellow physicist Russ Dobson, asking, "What would it mean to build the visual equivalent of a Moog Model Two analog synthesizer?"[8] Dobson answered that first, you needed to increase its bandwidth. The Moog had a 20–50 kilohertz bandwidth, whereas the IP went up to 5 megahertz because that was the bandwidth of a video channel.

The philosophy of reciprocity and generosity as it related to sharing intellectual property espoused a belief in the coevolution of humans and machines, because independent media relies on its hardware or software being robust, accessible, and affordable. In Sandin's model, the creator(s) share as much information as can be provided to the users transparently. The Sandin IP hardware manual begins with the heading "Distribution Religion." The open-source movement's conceptual origins can be traced partly to the capitalized text at the beginning of the IP's 117-page DIY manual on how to make the IP, a video art performance instrument:

DISTRIBUTION RELIGION
THE IMAGE PROCESSOR MAY BE COPIED BY INDIVIDUALS AND NOT-FOR-PROFIT INSTITUTIONS WITHOUT CHARGE. FOR-PROFIT INSTITUTIONS WILL HAVE TO NEGOTIATE FOR PERMISSION TO COPY. I THINK CULTURE HAS TO LEARN TO USE HIGH TEK MACHINES FOR PERSONAL AESTHETIC, RELIGIOUS, INTUITIVE, COMPREHENSIVE, EXPLORATORY GROWTH. THE DEVELOPMENT OF MACHINES LIKE THE IMAGE PROCESSOR IS A PART OF THE EVOLUTION. I AM PAID BY THE STATE, AT LEAST IN PART, TO DO AND DISSEMINATE THIS INFORMATION; SO I DO.[9]

The introductory words attempt to facilitate cooperation, collaboration, and exploration without exploitation. As he stated, as a faculty member at a state university, Sandin was paid by the state. He pointed to a strong connection between scholars' obligations to share their research and open-access scholarly publishing made available by universities. The manifesto evokes a transcendentalist hope in the spirit of self-learning and a belief in the symbiotic relationship between humans and machines. It serves as an ideology for teaching others to copy the designs for subverting capitalist cultural production using independent media. The model challenges the ideology of planned obsolescence that is built into the economy. By opening the IP's black box, the "Distribution Religion" manual acts as a force to expand proprietary hardware, software, and corporate control of video technology to include a world of tinkerers and activists. It saw, in the early 1970s, the ability to make, edit, and produce videos as essential to being heard. As Sandin noted, "If you challenge capitalism, you are going to lose . . .[It's important] to be able to hack out a methodology for yourself so you can do what you want."[10] Community was one of the most important things about these ideas. The phrase "Copy-It-Right" evolved to express the intention that people should copy the software or hardware, because, says Sandin, "if you don't have anybody using it, your software is irrelevant."[11] The goal was to increase exposure and build a community. Asking people to "copy-it-right" and giving them permission create a relationship between the creator of the IP and the users. This could be true of any software platform and its users if the creator(s) collect(s) the names and contact information of users. However, as Sandin emphasizes, he also believes that intellectual property is essential for artists because it allows them to support themselves and not "pump gas." He is part of a

posthuman movement to shift the labor of the means of production to the user's hands to enhance creativity and community interconnection.

Community Building Adventures

Sandin describes the IP as "interactive installation art on video signals."[12] It was designed for use in a classroom or lab to open up the space behind the screen for accessible computer science and engineering education presented through a hands-on STEAM project. At the heart of the IP's concept is the notion of intellectual property shared cooperatively for the benefit of humanity, a philosophy that also applies to the open-source movement. Thus, the serves as a pioneering model of open-source activism. If an artist who built the IP wrote to him with questions about the complex circuit-building project, Sandin often answered, and he continues to do so. In return, he wanted these users to share the video art they made using the by mailing him a recording of it. Building and operating the IP hardware inevitably came with wear-and-tear tech issues, resulting in repair or "Fix-it" sessions. Fix-it sessions could be called parties, too, as Sandin describes them—gatherings with pizza, beer, and friends—opportunities for artists in the image-processing community to share tools and expertise.

> When you build a high-tech device, there has to be an infrastructure to maintain it. . . . [It] all grew very naturally out of community . . . the community itself was the resource that made all of the [gear we created and disseminated] work.[13]

Herein lies the difference he emphasized between isolating corporate service maintenance contracts and what he and his compatriots were doing: IP maintenance operated as a *group community activity*, and, Sandin explained, "it was very effective at keeping high technology alive."[14]

Testament to the success of the IP community's engagement and maintenance, the IP continues to operate through the care of university labs such as Alfred, SAIC and artists such as Amy Karle. The IP, unlike technology, remains friendly to what Hertz and Parrika call a "black box . . . a system that is not technically understood or accessed, and as a result these technologies are often completely unusable when they become obsolete or broken."[15] Often, Fix-it parties were called "Build-it" parties or "Inauguration" parties. Building IP requires about a hundred cables for patching because the process could be challenging technically and the equipment pricey. Therefore, another type of "Fix-it" party would become a "Build-it" session when Sandin borrowed the tools from the television station at the University of Illinois at Chicago to work with a "production line" of IP users: artists gathered to fabricate several hundred cables for each other to patch the programmable modular computers together.[16]

The Original—Copy IP

The analog-computer-module logic has evolved into a digital data-flow software program called MaxMSPJitter.[1] Whereas Sandin made computer hardware to process video, I am using the IP's hardware technology as the inspiration for developing open-source software (figure 4). In the spirit of Sandin's *Distribution Religion*, the Sandin IP patch I have created is available to download and learn from in GitHub; note that MaxMSPJitter programs are nicknamed "patches" by the developers and users to continue the tradition. Zombie media archaeology professes that "we need to develop similar circuit bending, art, and activist practices as an analytical and creative methodology: hence the turn to archives in a wider sense that also encompasses circuits, switches, chips, and other high-tech processes."[17] The digital Sandin IP project attempts to "open the black box" at the heart of image processing and modern data. What I aim to challenge is the binary logic of capitalist thinking, which excludes the user while hiding the invisible labor and environmental destruction behind the circuits. The open-source sharing model offers an alternative vision of a symbiotic and posthuman world in which the machines are us. Let's tinker with new media archiving. To build your own IP for your archive, visit https://github.com/amandalong/Sandin-Image-Processor.
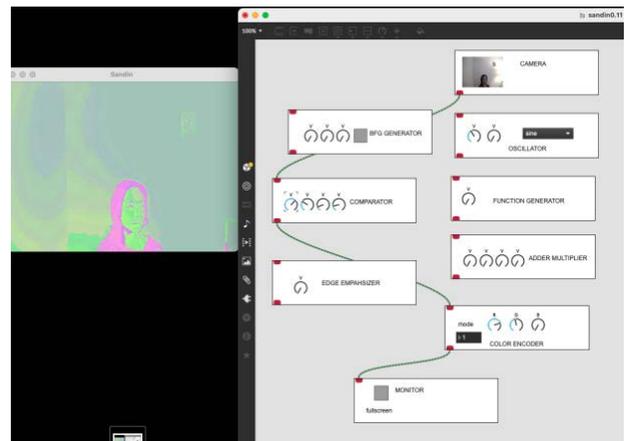
Figure 4. Amanda Long, screenshot of the Sandin software patch draft with modules to match the physical analog modules and cables. Note the digital symbolic representations of the analog patch cable and modules. The graphic user interface GUI cannot replicate the tactile, tangible interface joy of turning the dials and plugging in the cables, but it does provide satisfying real-time image processing aesthetics to mimic the analog Sandin IP. ©Amanda Long.

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[1]An open-source version, Pure Data, exists, too.

Acknowledgements

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[6] Dan Sandin, *5 Minute Romp thru the IP*, 1973, YouTube video, https://www.youtube.com/watch?v=8qh6jRzjmcY.
Dan Sandin later shared his version, which has a different ending, https://vimeo.com/663928209.

[7] Sandin interview, "Property Rites," 11:16–11:21.

[8] Sandin interview, "Property Rites," 01:05:17–21.

[9] Dan Sandin and Phil Morton, *Distribution Religion* (Image Processor manual), February 28, 1976 (with handwritten notes from October 1978), page 3. http://www.criticalartware.net/DistributionReligion/DistributionReligion.pdf.

[10] Sandin interview, "Radical Architecture," 33:52.

[11] Sandin interview, "Radical Architecture," 58:41.

[12] Sandin interview, "Property Rites," 01:23:42.

[13] Sandin interview "Radical Architecture," 28:42–50, 32:52–33:01.

[14] Sandin interview, "Radical Architecture," 36:52–37:04.

[15] Hertz and Parikka, "Zombie Media," 428.

[16] Sandin interview, "Radical Architecture," 28:57.

[17] Hertz and Parikka, "Zombie Media," 429–30.

Author Biography

Amanda Long is a video sculptor, animator, mirror maker, lover of the Earth and Sun and the animals, and a dreamer of fairy-tale visions. She fantasizes about giving technology a soul and making peace between humans and nature. Long's artworks enable their viewers to share the role of being an artist by being active participants. She wants the artwork to be a type of "reclamation," to offer people a sense of power over how they are represented on camera and over the space in which the artwork is shown. Her installations include *Silly Faces aka Strike a Pose*, National Portrait Gallery, Smithsonian, Washington, D.C. (2016); *Wishing Well*, Dyckman Farmhouse Museum, New York City (2016); and *Portal* at Socrates Sculpture Park, New York City (2014). A second installation of *Silly Faces* and an *Animation Station* opened at the Katara Children's Mall, Doha, Qatar, in fall 2022.

Cyberfeminism Index: Noah's Archive of Cyberfeminist Art and Culture

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Abstract

This research examines the connection between cyberfeminism and the preservation and archiving of digital art. Utilizing Ursula K. Le Guin's "Carrier Bag Theory of Fiction" (1986) as a poetical framework, which suggests that the first tool created by humans was a basket, not a spear, the paper offers a speculative interpretation of the history of technology that emphasizes the significance of gathering and sharing over hunting and domination. The field of digital art is particularly susceptible to technological obsolescence, making collecting and preserving such work even more critical. The *Cyberfeminism Index* provides a valuable case study for tracing the genealogy of digital artifacts of cyberfeminist art from the 1990s and 2000s through collecting and curating them and ensuring their preservation for future generations. It is a web-based platform that facilitates the collection of digital art while also preserving the autonomy of each individual artifact and serves as an example of an archive that is imagined, organized, constructed, and maintained in a manner that aligns with cyberfeminist visions of building a feminist Internet. This study addresses the question of how to create more feminist archives and aims to explore the question of what to do with digital art that is already available online. By selecting, reinterpreting, and presenting existing digital art in new contexts, cyberfeminist artworks can be revitalized and given new meaning.

Keywords

Cyberfeminism Index, digital archives, preservation, cyberfeminist art, future-proofing, politics of care, hyperlinks, decentralization, non-hierarchical structure, feminist heritage.

Introduction

In her seminal essay "Carrier Bag Theory of Fiction" (1986), Ursula K. Le Guin posits that the first tool invented by humans was not the spear, as commonly believed, but rather the basket. [1] This theory is based on the idea that the ability to use containers to store fruits and vegetables collected from the natural environment was a fundamental predisposition for human development. This speculative reinterpretation of our history of technology highlights the importance of gathering and sharing rather than hunting and domination. In light of contemporary issues surrounding excessive production and exploitation of natural resources,

this theory encourages us to consider the act of gathering with greater thoughtfulness and to question what we are collecting and why.

The field of digital art is particularly susceptible to obsolescence, making the preservation and archiving of such work all the more critical. Cyberfeminist art of the 1990s and 2000s provides a useful case study for tracing the genealogy of digital artifacts, collecting and curating them, and preserving them for posterity. One such archive that has taken on this endeavor is the *Cyberfeminism Index*, a web platform that facilitates the collection of digital art while also maintaining the autonomy of each individual artifact. The *Index* is imagined, organized, built, and maintained in an architecture that aligns with cyberfeminist visions of building a feminist Internet, a historical yet still relevant nuisance of the digital space.

This paper addresses how to create more feminist archives and aims to explore the question of what to do with digital art that is already available online. By examining the process of selecting, reinterpreting, and presenting existing digital art in new contexts, the paper demonstrates that this approach can revitalize the work and bring new meaning. The focus is on how to organize and facilitate the presentation of digital art that is already online and how this can be done in a way that is meaningful and impactful.

Context of Cyberfeminism

The Internet emerged in the early 1990s, and alongside its emergence came the concept of cyberfeminism. British philosopher Sadie Plant and the Australian art collective VNS Matrix developed the idea simultaneously yet independently. Initially, techno enthusiasts believed that the Internet would improve the quality of life and democratize access to knowledge. Based on the theoretical ideas of Donna Haraway's cyborg theory (1991), cyberfeminists hoped to create a radically feminist virtual space where they could be safe from sexism, harassment, and oppressive social arrangements. [2] Cyberfeminism was always playing with the idea of the future, radically imagining and building one, inspired by science fiction, fantasy landscapes, and human-machine hybridity in the virtual realm. They were inspired by female science fiction writers such as Octavia

Butler, who also envisioned a non-essentialist safe haven in cyberspace. However, cyberfeminist expectations from the Internet did not become a reality. The Internet ultimately proved to be a reflection of social conditions in the real world and has become a playground for (often misogynist and xenophobic) cyber violence, which can be even more severe online due to the anonymity of perpetrators.

Cyberfeminism brought feminisms and technology into a dialogue, a negotiation of how the world can be rebuilt and expanded as a counterpoint to values of patriarchal hegemony. According to Sofoulis (1998), "the question is not one of dominance and control, or of submission and surrender to machines; instead, it is one of exploring alliances, affinities, and possibilities…between women and technology." [3] Feminist artists saw much potential for collaboration and building a meeting space where they could develop an ideology of hyperlinking and connecting.

The internet-nascent art of the cyberfeminist movement has origins and continues to exist within the virtual realm of the World Wide Web. For net art, digital archives serve as their natural habitat and the only ecosystem in which they can be fully authentic, complex, and multidimensional. Archives possess an inherently political nature, as they involve decision-making processes (organizational, algorithmic, curatorial), reflect certain power relations, and serve as platforms for distributing cultural resources. This research attempts to identify an archive that subverts institutional hegemony by preserving the artwork's original context as defined by the artist. All projects on the *Index* are described in the words of the artists using original citations or quotes, in first voices, emphasizing the individualities within cyberfeminism.

Facilitating as Curating, Curating as Archiving: Cyberfeminism Index

The *Cyberfeminism Index* is a digital archive that spans over three decades of new media and tactical art created by cyberfeminist artists from all inhabited continents. [4] The Index provides a comprehensive overview of the historical practice of cyberfeminism, which has been developing since the early stages of inhabiting the World Wide Web. The structure of the Index is a virtual carrier bag of hyperlinks that lead to sites that host cyberfeminist projects, historical and contemporary. It is designed as an intersection embedded with hyperlinks. The option is to convert digital artworks into physical objects by micro-curating and downloading a personal .pdf file. The architecture of the *Index* contributes to the decentralization of content and brings faithfulness to the original interpretation of projects. Since it does not appropriate any content, but instead directs toward it, it does not require legal ownership of the works. However, the format of an index also poses a weakness, as

websites are constantly changing and links can mutate or die. To address this issue, the *Cyberfeminism Index* replaces dead links with screenshots from the Internet Archive's Wayback Machine. The *Index* is an organism with perpetual demand for maintenance, and as the facilitators profess, it is *INCOMPLETE and ALWAYS IN PROGRESS* [5].

Design and Aesthetic

To future-proof the *Index*, the least possible amount of extra tech was used, such as JavaScript for client-side and Python for server side. Accessibility was prioritized from the start, "so screen readers, alt text, closed captioning, and more, are built into the site's core rather than retrofitting it afterward. Accessibility is durability." Mehta (2018) points out that "in the context of hyper-connected data-driven societies – as cyborgs (networked individuals) in cyberspace (networked space) – archives are cybernetic containers of accessible, meta-tagged, cross-referenced, non-linear, transmedia data; observing systems that span several existing social and professional platforms to create a self-sustainable data multiverse." [6] All these attributes are a value system cyberfeminists wanted to unpack on.

The structure and design of the *Cyberfeminism Index* website is non-linear and non-hierarchical in nature. The website employs a minimalist aesthetic, utilizing default web elements and system font (Arial) to ensure that it remains functional even as its appearance changes due to software updates and other technological shifts. Navigation of the site is not limited to a single method, but rather offers multiple ways of searching and exploring. The design and functionality of the website are user-friendly, with simple fonts, colors, and a default black-and-white aesthetic that is activated by user interaction, revealing a green glow effect. The cursor is also designed to leave a visual trail while traversing through the *Index*. The website's design functions as a resource for defying digital obsolescence or future-proofing.

The aesthetic of the website is hardcoded, simple, and durable, characterized by no- or anti-aesthetics. The website's design was influenced by the *100 Anti-Theses* webpage by the Old Boys Network [7], a static website from 1997 that is still functioning over two decades later, and Alexei Shulgin's *Form Art*, an early net art piece from 1997 that utilizes HTML form elements without changing their default styling. [8] This intentional design that accommodates inevitable changes, akin to a website that designs itself over time, served as inspiration for the designers of the *Cyberfeminism Index*.

Structure and Politics

The *Cyberfeminism Index* is a socially engaged heritage practice that aims to revise Internet history through a cyberfeminist lens. It employs cybernetic principles such as

feedback and self-organization, which have been employed in writings on media, from Marshall McLuhan and the video movement in the 1960s and 1970s to the cyberpunk fiction and cyberspace texts of the following decades. The Index tells a different story of the Internet through the lens of its makers, and the multiplicities of cyberfeminism are emphasized through original citations and quotes. One of the fundamental ideological principles of the Index is its emphasis on transparency. All of the structural tables, data, HTML code, and Google Spreadsheets are made publicly available online on the facilitators' personal website. This gathering and democratization of knowledge serves as a tool for survival in the future, and is a political act in itself. As Paul (2007) asserts, "the hidden or protected back-end of any project - be it a database or code - always makes an inherently political statement about access and its control, which is perfectly captured by the implications of client-server relationships. [9] In this context, adopting a peer-to-peer approach instead of a client-server relationship becomes both a philosophical and a political issue, as it holds the potential for liberation from centralized servers.

The Ideology behind the *Cyberfeminism Index* is embodied in the theory of hyperlinks. The facilitator of the Index was inspired by the book *Writing Machines* by Anne Catherine Hayles [10] and *Politics of Citation* by Sal Hamerman. The term "hyperlink" was coined in 1965 by Ted Nelson and his assistant Calvin Curtin at the start of Project Xanadu (proto-internet) as a more horizontal and collaborative, decentralized dispersion of power, challenging conventional data structures and vertical hierarchies. The theory of hyperlinks is about relational organization, it is anti-hegemonic, posing a dialectic of different opinions and interpretations. This technical solution implemented in the *Index* is rooted in feminist theory emphasizing connectivity and collaboration, as embodied in a quote by a pioneer net artist Olia Lialina: "All you need is link." [11] The *Index* relies on hyperlinks and collaborative editing and crowdsourcing for its compilation, preservation and longevity.

Curatorial approach: Who is the Noah of the Arc

The *Cyberfeminism Index* utilizes a unique approach to the selection and organization of its content, referred to as "gathering" or "facilitating" rather than "curating." This approach emphasizes the avoidance of creating hierarchies and instead focuses on building relational ethics through the act of webbing, or constructing a structure akin to a spider web.

The curatorial politics of the Index are based on the principles of open-source, and its intended target audience is inclusive of all Web users, rather than being limited to the art community or academics. The *Index* is in line with the

original cyberfeminists' ideals of connectivity and collaboration, as it employs citational logic, hypertext, and footnotes in its construction. The website utilizes a radically non-linear logic, with no pre-assigned hierarchy, which promotes intuitive exploration and individual content curation.

The content on the *Index* is divided into two main categories: "YACK" and "HACK." The distinction between these two categories refers to theory and practice respectively. The website's drop-down menu is further divided into five sections: Cyberfeminism Index, About, Images, Collections, and Search. A unique feature of the *Index* is the option for users to navigate their search by browsing only images, without accompanying text, providing a nostalgic and visually-based approach to exploring the genre of cyberfeminism.

The *Cyberfeminism Index* currently features around 800 projects, which were crowdsourced or sourced from cyberfeminist art anthologies. Among these projects, 13 contributors, including cyberfeminist artists, writers, and activists such as Legacy Russell, Melanie Hoff, and VNS Matrix, curated their own collections. The *Index* will continue to operate under the post-custodial stewardship of the founder Mindy Seu and other community members, remaining open for submissions and collaboration in the future.

Conclusion

The Cyberfeminism Index serves as a valuable example for future forms of organization in digital archives. Its approach to incorporating a cyberfeminist perspective on technology while also considering the platform's sustainability and adaptability for the future illustrates the significance of considering politics in the management of knowledge infrastructure. The use of original citations and quotes from the artists themselves, along with the option for users to download content, emphasizes the importance of decentralization and resistance against the hegemony of knowledge.

Furthermore, the use of Google Spreadsheets as a structural tool highlights the potential for technological tools to be used in a decentralized and non-hierarchical manner, a philosophy that can be applied to future politics of multi-dimensional virtual spaces. The *Index* serves as a model for a feminist approach to archiving, enabling cultural resistance and connectivity through data and content curation.

An identified unfavorable aspect of the *Index* lies in the potential for the obsolescence of particular links, which poses a threat to the continued preservation and accessibility of various artworks. However, even in a state of dormancy, these links serve as important historical documents that witness to the existence of these works. They offer invaluable resources for researchers to scrutinize, as well as provide an

opportunity for contributors to revitalize their content once these links are restored. Additionally, future scholars may reference these documents as evidence of the existence of these artworks in times past. Some of the potential solutions lies in the InterPlanetary File System and blockchain technology. Further research would open space for their implementation in archiving and preservation.

The works featured on the *Index* represent radical techno-critical activism that shapes a cyberfeminist counter-public. It is important to consider how the content and organization of such archives will evolve over time and how heritage is performed within it.

The *Cyberfeminism Index* serves as an example of how an archive can act both as a portal and a container, with curated items coming together to create a multiverse, while also transporting users into the world of cyberfeminists. The on-going test of time for such archives is how the content and organization evolve, how space is negotiated, and how heritage is performed within it.

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Author's Biography

Andrea Tešanović is a producer, artist, and researcher with a multi-disciplinary background in media art, cultural management, and feminist activism. Her cultural and artistic practices emphasize the merging of disciplines and challenge dominant patriarchal power structures. Her practice encompasses various topics, including video art, media art management, and curating. As a researcher, her work is unpacking the transdisciplinary intersection between art and science, unraveling biotechnology and synthetic biology in media art, feminist critical theory, and robotics. In recent years, Tešanović has been involved in producing festivals, exhibitions, and performances across Europe and the Balkans.

Digital strategies as our common challenge:
The work of Open Resource Center and AuDA

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Abstract

New Media institutions lack on a digital strategy and relay on an isolated, non-coherent, sedimentary and fragile digital environment. After COVID-19, different programs were created to support these institutions, but the question of the maintenance in the long term is unclear. This is a common problem between academic and cultural institutions (museums, archives, etc.), and a network has been created to confront these challenges together.

Keywords

New Media institutions, University, Archive, Digital Assets Management, Digital Strategy, Digitization, digital empowerment

COVID-19 has disclosed the elephant in the room: even New Media related institutions have faced (or are facing at least some) difficulties that show that they are not as well digitally prepared as one may think. While almost all the institutions follow strategies and have clear guidelines for other processes (hiring new people, budgeting materials or services for the projects, etc.) there is no framework for implementing or developing digital tools: institutions depend on the necessity or engagement of staff or system administrators to build and maintain their digital environment, which results in important differences between institutions, departments or projects. In an optimistic description, we may characterize the previous situation as isolated (as tools were implemented separated with no communication between them), non-coherent (or chaotic, lead to specific necessities), sedimentary (understood as an accumulation of discontinuities, i.e. the superposition of tools developed by different projects, some of them already finished) and fragile (generally tools and infrastructure depend on one or few engaged people and there is no clear documentation).

During the first hard phase of the pandemic, institutions reacted with urgency, implementing tools to allow them to continue their work "as usual". The uncertainty of the situation and the urgency back then could justify the short-term oriented implementation, the trial and error approach and the lack of a long-term strategy, which was already a common practice. Nonetheless, the creation of different support programs for "digitization", some of them

financially well-endowed, allows confronting this situation from another perspective, focusing on a mid-term planning, which projects that are or have been funded for 3 years: It is problematic to approach infrastructural problems with conjectural solutions, and, considering the administrative rhythm and the complexity of some of the tasks, the time frame seems tight; on the other hand, it is not clear what will happen with the maintenance of these tools and infrastructure once their creators are not funded.

Digitization has been, at least in Germany, the buzzword used by academic institutions to fund solutions to all sort of problems: from video-conference systems and equipment to project management tools, from e-learning platforms to training in digital competences, from acquiring scanners to systems for managing prospective students, just to mention some of them[1]. The *Stiftung Innovation in der Hochschullehre* (Foundation for Innovation in the Universisty Teaching) has been supporting projects to allow German universities to get digital. The Staatliche Hochschule für Gestaltung Karlsruhe (Karlsruhe University of Arts and Design), a new media art and design university, used this possibility to fund Open Resource Center, a project to, among others, develop and implement an archive and media-platform system, Madek, created by the Zürich University of Arts (ZHDK) under (open-source) free software license [1], that should be integrated in the institution. This holistic approach should enable the university to collect digital assets from different actors (e.g. student's projects, research output, or conference videos, presentations, and images) and manage their access or pull them to other interfaces: students can upload project files and share them with others, for example, the press department (that may publish on the institution's website or social media) or the archive (that will take care of archiving it).

This work-flow may sound familiar to other cultural institutions (museums, archives, libraries, production centers or residency spaces), who store their media material in Digital Assets Management systems. These platforms are, in general, proprietary software and outsourced[1] and some professionals have informally shared the feeling that they're not taking the most of it: even if further development is possible (to introduce new features, make it interoperable with other tools and integrate it in the staff's work-flows) the exclusivity enhanced by the proprietary software license makes the costs really high, and it is really difficult to search partners to confront this problem; the approach consists in

taking the software "as it is" and bend the work-flows around it.

Like academic institutions, cultural institutions lack on a digital plan that reflects the discussions and agreements on the different needs and possibilities. There is a separation between non-technical staff and system administrators: the first ones cannot grasp the complexity that maintenance implies, while the seconds are overloaded (more software means more maintenance) and do not understand the needs and cannot offer proper support or documentation [4]. That can explain the difficulties and low rates of adoption of institutional tools (in opposition to paid or free versions of third-party tools used in professional or educational context) in this kind of organizations: even if apparently more convenient for the user, these applications may have various issues that should be discussed in a strategy plan. An appropriate digital infrastructure is a sociotechnical construct in which developing tools is important, but also maintaining them, generate documentation (guidelines, manuals, how-to), organize workshops or training on digital tools (basic in a context of staff turnover), adjust to existent workflows as well as discussion about potential problems and enhancements [5].

In other words, it seems that cultural and academic institutions are facing similar problems, which is coherent if we consider the strong connections between them. That is why Open Resource Center initiated, one year ago, an informal exchange between professionals (from archives to data managers, commissioner for the digital, knowledge-transfer agents, press department, libraries, e-learning projects) working in different institutions (museums, archives, university, art schools) but all of them concerned with digital assets. Since then, the network has been slowly growing and is searching for funds to establish a minimal infrastructure that organizes, takes care and makes these discussions accessible. The network has also started a program to enable their members to understand and confront different aspects: the first monographic session about digital infrastructures took place at the end of January, approaching an issue for everyone in the network but with different perspectives (from not having a proper digital infrastructure, to solving difficulties in its maintenance or facing interoperability issues). This network of professionals proposes to confront, together, our common challenges and design sustainable development strategies for the digital environment of New Media institutions.

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Author Biography

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-Papers: Artist & Archives-

ARCHIVING THE IN-BETWEEN

ONB-Labs Art Program – Artists engaging with digital collections of the Austrian National Library

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Abstract

ONB-Labs is the platform of the ONB (Österreichische Nationalbibliothek/Austrian National Library) for scientific and creative use of digital collections. In addition to the general opening of selected digital collections as images, texts and metadata, the ONB-Labs actively seek the exchange with young as well as established artists since the beginning of the ONB-Labs in 2018. Currently, in collaboration with the University of Arts Linz, Austria, ONB-Labs is now going a step further by critically questioning the artistic/scientific engagement with digital collections and archives as well as their potential of expanding knowledge spaces through and with the work on data. This paper analyzes and highlights recent results of artistic-scientific processes and contextualizes the potential of working on the processes of "archiving the in-between" via artistic/scientific means and therefore highlighting relations and connections between data, objects and spaces in archives in order to gain new knowledge and open new ways of understanding and engaging with digital collections. Based on the archiving strategies and experiences of the Interface Cultures Department at the University of Arts Linz in relation to forms of representation of an artistic oeuvre in digital space (as presented last year by Tiago Martins, Christa Sommerer and Laurent Mignonneau [1]), this paper refers to the digital original in the digital inter-spaces and critically examines the procedural, artistic and scientific gain of knowledge in the process of ordering, connecting, translating and contextualizing the in-between of the digital archive realm.

Keywords

Austrian National Library, open digital collections, artistic/scientific abstraction, critical data reflection, hidden knowledge, translation processes, archive and experiment

Introduction

Access to archives is of particular importance in times of artificial intelligence and automated processes of information handling. It is probably even more important than ever that so-called originals can be viewed, even visited and understood anew, as contextualization and interpretation are increasingly taken over by trained algorithms. Digital archives and collections, with their digitized originals, provide such sites of engagement. In particular, with this paper we present the digital archive of the ONB (Austrian National Library/Österreichische Nationalbibliothek) and those collections that are made available for further processing and use within the framework of ONB-Labs, the Austrian National Library's platform for digital collections. In November 2022, the ONB-Labs through an open call invited students from the University of Arts Linz, the Academy of Fine Arts Vienna and the University of Applied Arts Vienna to engage artistically with the four dedicated digital collections and create artworks from historical postcards, newspapers, travelogues or botanical illustrations [2]. For resulting artworks, neither form nor medium or material have been predefined, the only prerequisite for the artwork was a final presentation in a web browser, namely the ONB-Labs Artspace [3].

Based on the open call, four artistic/scientific approaches to working with the digital collections were selected. Criteria for the selection were, in addition to an outstanding artistic concept in relation to the specific collections, the possibility of implementation within the framework of a three-month project duration and a process that, above all, takes the digital component of the collections into account accordingly. Workshops introduced artists to the specifics of the collection and accompanied them in the development of their work. Additional experts were consulted as needed, building an interdisciplinary team towards exploring the future potential of archives.

> "The urge towards the future is intrinsic to the archive - as a ressouce for shared narratives that need to be rewritten again and again."[4]

Library Labs as Environments for Innovation

The ONB Labs were established at the Austrian National Library as a platform for scientific as well as artistic engagement with open digital collections of historical library holdings [4]. The Labs environment is since then a

core pillar of the library's Digital Humanities strategy [5]. For at least a decade libraries all around the world provide environments that are designed to support digital research at different stages of the research cycle from digitization to data acquisition, data cleaning or data analysis. Some libraries offer physical Labs or maker spaces usually including staff support [6]. Others, like the ONB-Labs are virtual platforms offering datasets, tools and service support. What is pivotal for both, physical as well as virtual labs, is the engagement with the user community. Concepts like embedded librarianship or datasteward define an understanding of librarianship that goes beyond the role of mere data providers by closely collaborating with researchers throughout the entire lifetime of projects [7]. While in the traditional scenario of library use, users had to understand the library system in order to fulfill their needs, libraries shifted from rule based services to user centered services. Understanding the user community's needs implies also the libraries willingness to be open for critical perspectives on the library system as well. Although terms such as "laboratory" and "experimental" are criticized as being mere metaphors, they represent labels for a specific episteme of digital workflows, namely the openness of the scientific process as a tentative search for incremental solutions [8]. A Labs environment is thus meant to be a physical or virtual space for experimentation, for innovation or simply testing something unusual. For research libraries such as the Austrian National Library the traditional core user group are researchers. The creative use of library material for most research libraries is still unusual.

Open Digital Libraries for Creative Use

The Open Glam Labs movement brings together Labs from different cultural heritage institutions sharing the idea of openness. The ONB Labs have followed the pathways of others, especially the British Library Labs, which opened a "treasure trove for creative industries" [9] by forwarding an open content policy. At the ONB-Labs kickoff presentation in 2018 the team invited an audiovisual artist for a performance based on data from the ONB's digital newspaper collection (ANNO) underlining the co-presence of artistic perspectives. In 2020 the ONB/Austrian National Library joined efforts with the National Libraries of the Netherlands (KB) and the Estonian National Library (ENL) for fostering creative usage of library data in the EU-cofunded project "Open Digital Libraries for Creative Use" (ODL) [10].

The project aims for experimenting with formats of collaboration between artists/ art students and library staff and at the same time building a knowledge base to be shared with other libraries. The project includes a work package for artistic experiments, initially meant to be physical exchange residencies for art students. Due to COVID-19 the ONB-Labs decided to go for the format of web residencies. In spring 2021 and 2022 two calls were announced for artistic web residencies. The call offered artists funding for the production of a web based artwork. While for the first web residency artists were invited to select from all datasets available, the Labs team offered a curated selection of newspaper issues from the Wiener Zeitung and aerial photographs from the 1930ies for the second residency. Both residencies were accompanied by an advisor, who also supported the selection.

For the first web residency the artist Rosemary Lee created an endless scroll of countermoving shapes she took from the Austrian National Library's digital postcard collection (AKON) and text snippets related to the phenomenon of crypto art. In the second web residency two young artists produced artworks that although very different in their content share the interest for gestures of web interaction. Sînziana Păltineanu took text and image snippets from the Wiener Zeitung in order to construct a multipathed narrative as a "limping walk" over the corridors of the imagined newspaper office. Every click opens a new pathway. The urge of going back by simply pressing the "back" button of the browser remains unfulfilled. The artwork reflects on the explorative gestures of walking and clicking. Ida Westh-Hansen took copies of digital postcards, printed and literally cut out shapes of landscapes and combined them with snippets from her personal image archive. The gesture of the scroll creates new samples randomly. Again, the aesthetic experience gained from interaction with the artwork remains ephemeral, thus outside the archive. Her artwork named "Boon Scrolling" marks a counterpoint to the phenomenon of doom scrolling, by intentionally slowing down the speed of the scroll. Ida's artwork makes aware of the fact that the massive digital archives may have made access to information easier, but quite often substituted doom flipping with doom scrolling.

All three artworks represent artist's perspectives on archives. Since the second half of the twentieth century artists have shown increasing interest in archives and archival order especially [11]. The crossing of institutional archives with personal archives is as much a common topic for artists engaging with archives as much as the dialectics of order and randomness. These artworks touch core topics of the library system. The ONB offers different platforms for exploration of its vast collections. These platforms are mainly designed for information retrieval. In order to offer an aesthetic experience of the artworks created in course of the programs the ONB-Labs team set up a special artspace within the ONB-Labs platform. The aim was to keep the frame of the artspace as simple as possible and let the artworks stand for themselves.

Labs Art Program for Art Students

Regarding a new edition of the ONB-Labs Art Program in 2022, the cooperation with Univ.-Prof. Dr. Irene Posch and Univ-Prof. Mag. Manuela Naveau PhD of the University of the Arts Linz was sought. The starting point for the discussion was an Open Call, which was primarily intended to enable young student positions and approaches to the topic and the new digital collections. Whereas the first two calls were designed as web residencies addressing artists of different genres and different career levels, the target group for the Art Program were students of Austrian art universities and academies. From the perspective of the library it is crucial to search for mediators. The ODL

partner library KB had already run student art programs in collaboration with the KBK Delft [10]. Main learnings that resulted from an exchange meeting among project partners were the challenges of fitting the programs schedule with the students curriculum and the need for introduction to the library materials. Librarians tend to expect users to have sufficient knowledge about the library system, how the library works and how the collections are structured; people not closely familiar with a librarian's work on the other hand often lack basic understanding of the organization, tasks, and data structures involved in (digital) librarian work.

The ONB-Labs team members Martin Krickl and Sophie Hammer therefore decided to run a call among a more specific target group, plan for more exchange and have more guidance especially in the beginning of the course. For the library it is important to learn more about artistic workflows, which differ from workflows in research projects. A challenge to be faced is balancing the need for planning in order to achieve viable outcomes within the limited time frame of the course by giving the artists as much freedom as possible. The ONB-Labs team accounts for bringing the expected outcomes into the ONB-Labs Artspace, a kind of curational act, for which the effort has to be estimated as accurately as possible while taking into account that the production of art does not follow the pattern of linear product development. Although the students were asked to hand in a concept of the artwork, the outcome is not clear at all in the beginning. Therefore the ONB-Labs team together with the two advisors Irene Posch and Manuela Naveau planned for early feedback and guidance on a regular basis.

Digital Library Data as Basis for Artistic Exploration

Four collections were selected for the ONB-Labs Art Program, representing the rich diversity of the ONB's digital collections. Each of the collections consists of different types of media and originally served specific purposes in the fields of media, communication, or in a social context. The required data sets were prepared individually for the selected participants at the beginning of the art program.

The **AKON platform** contains postcards from all parts of the world and is the ONB's postcard portal. From the beginnings of the illustrated postcard at the end of the 19th century to the early 1940s, a total of about 75,000 digitized postcards with topographical image motifs can be found both via the names of the depicted places and by means of navigation via a digital world map. Some of the postcards also contain messages from distant destinations.[12]

The second collection were the historical issues from the **Wiener Zeitung**, one of the oldest newspapers worldwide, which was already provided for the second web residency. The public domain collection contains approximately 34.000 issues published between 1703 and 1882. The fulltext search implemented in the ANNO platform [15] offers a good starting point for the exploration of this vast corpus [16].

Botanical illustrations from the first half of the nineteenth century, made for the former Habsburgian emperor Franz I. (II.) by the court botanical artists Mathias Schmutzer and Johann Jebmayer, were chosen as a third collection [13]. 1.800 digitized gouaches from the Austrian National Library's graphic collections are browsable in the ÖNB Digital [17].

Additionally, the Labs team chose a selection of **travelogues** to the former Ottoman Empire, published in German, English and French between 1501 and 1850. The corpus was set up in the course of a research project about multimodal representations of Ottoman Nature(s) in travel accounts from the Early Modern period to the mid of the Nineteenth century, including full texts as well as many illustrations and maps. The corpus is accessible via the public access catalogue by entering the search term "projectONiT*" [18].

For the Art Program the Labs team decided to offer introductory information about the collections, their structure, history and how to access them. Therefore, a kick-off meeting took place bringing the students together with the advisors and collection experts who provided rich contextual information for a better understanding of the archival material. Though the students are expected to work with digital material only, the experts nevertheless presented physical objects so that the students may also take into account the original materiality of the resources.

For the first step the Labs teams decided to present user interface access points as most usable start for an exploration. The Labs teams also introduced the art students to programming interfaces provided by the ONB, like the IIIF-API SACHA (Simple Access to Cultural Heritage Austria) [14]. What is crucial is to offer technical support from the very beginning of the project. It may have been an option to invite the students to use everything they could get via the APIs, but we agreed on providing individual solutions as the better way to go. The scope of the midterm workshop is to have another feedback loop and to gain a concrete plan for the implementation of the artistic concept from each participant.

Artistic curiosity vs. vast amount of data

All of the final selected artistic positions are characterized on the one hand by a huge amount of curiosity, with which they tried to open up this actually unknown terrain of concentrated knowledge, and on the other hand by a certain feeling of helplessness, because of the vast amount of data and information that is available. In a first step, the advisors and the ONB-Labs team therefore not only had to recognize whether the artistic concepts were feasible in the sense of a conventional assessment such as the quality of the submission, skills for implementation, or budget issues, but also had to recognize the extent to which it would be possible to process the archive and selected collections or parts of it within the projected time frame. In the following we briefly want to introduce the works selected for realisation as part of the program.

Score of visual connection research

Lisa Puchner (AT) comes from the field of sculpture and is a film sound technician and radio producer. In her artistic work, there is a particular focus on the connection between sound and image and the ideas associated with sounds, as well as on working with found structures and everyday materials. As part of the ONB-Labs Art Program, the artist works with the digital collection of postcards from the AKON platform to abstract sound lines. In her words: "In *Horizon Noise* the horizon of postcards sets the tone, the view remains abstract. As the horizon stands for distance, traveling, desires, postcards as well are screens of projections for the idea of a place, staging the view and horizon accordingly. *Horizon Noise* visits and re-imagines different places with help of the horizon pictured on postcards and the acoustic translation of this thin line between earth and sky. Skies and horizons pass by, the missing views of the actual built or natural landscape of the place on the postcards is replaced by the melody of the horizon – or skyline in cities –, sometimes only interrupted by a postcard's frame. Scrolling between mountain and seaside, one can listen to the differences between the horizons' melodies ringing out from a distant, undifferentiated noise as well as between natural and man-made horizons."
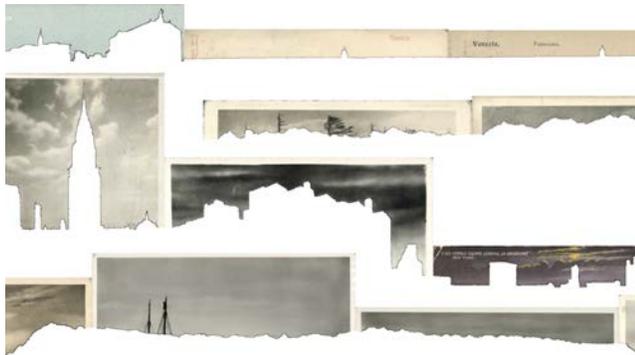
Horizon Noise by Lisa Pucher. Image by the artist.

Archive as memory palace

Katharina Birkmann (DE/AT) works on theories and practices of cross-disciplinarity with focus on moving images, documentary theatre and narrative multimedia installations. As part of the ONB-Labs Art Program she uses the archive of the Botanical Illustrations, ANNO and Postcards, as well as the physical archive space to develop her piece **Blumenstadt Venedig oder die Elektrische Stadt. Exterritorial** (eng: Flower City Venice or The Electric City. Exterritorial). In her words: "Tying memory to places and organizing it spatially is a system with a long tradition. The idea that documents need some kind of accommodation is already reflected in the term archive itself: archeíon ,office, building'. In contrast to fictional memory architectures, these 'office buildings' hide their fictional as well as fantastic nature behind a facade of neutrality. Virtual archives, by simultaneously "being in space", re-animate hybrid impressions of space, time, memory and knowledge. The Würstelprater and its historical development since 1895, between real places and fictional architectures, introduces concepts and stories of locality, fiction, simulation and virtuality. The potential to make archives spatially experienceable as scripts for storytelling - documentary or fictional - enables experiencing and actualizing history as story."

Blumenstadt Venedig oder die Elektrische Stadt. Exterritorial by Katharina Birkmann. Image by the artist.

Hyperconnectivity

Miguel Rangil (ES/AT) focuses both his research and artistic production on new contemporary strategies to address through art the hybrid condition of the human being and the awareness of the current problems between humanity, technology and nature. Questioning how so-called Artificial Intelligence (AI) will not only affect the way we see, understand and interact in the future, but also how we understand our past, is the basic topic of his work for ONB-Labs Art program. In his words: "Can artificial intelligence be a tool that speaks to us about the essence of things? Can we extract "something" that unifies a heterogeneous dataset? To address these questions, *Hyperconnected Past* uses various image generation and recognition methods based on machine learning (StyleGAN2, Computer Vision) and the digital collections of AKON and Botanical Illustrations, to configure a brief web essay about the essence of the image through a retrospective look into the past."

Hyperconnected Past by Miguel Rangil. Image by the artist.

Statics animated

Valentina Rodríguez Morales (CO/AT) through her creative methodology seeks to reinterpret the archival image in different techniques and media as a study of the

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image as a historical object, either as a document of a specific moment or as a node that are repeated in time and allow fictionalizing between different realities and temporalities, opening new possibilities within unconventional narratives and establishing a dialogue between the present and the past. She describes her work *Echoes of Experience* in the ONB-Labs Art Program as follows: "This project presents a digital open letter using the Travelogues and AKON archive from the library's digital collection. This work arises primarily from a sentimental relationship with the archive and personal experiences as a migrant. The starting point was the reconfiguration of the collected text for the creation of a new metafictional archive that relates the feeling of foreignness and exoticism linked to the arrival in a new territory, and of course the stereotypes that this entails. The visitor can go through the narration without any specific order and submit oneself to the exercise of empathy and of finding oneself in what is foreign."

Echoes of Experience by Valentina Rodríguez Morales. Image by the artist.

Archiving the In-between

The complexity of our world by no means excludes archives, nor does it stop at them. On the contrary, questions arise whether archives could be understood as a mirror of our world, since they collect important information from the past and present, but contextualize and try to organize it anew in the now. This form of contemporary organization and representation is strongly questioned on the part of the artistic works, and methodologies such as, on the one hand, visual scores or virtual space as a model of order and reference (memory theater). On the other hand, questions about the hyperconnectivity and linking of (moving) information in the archive and beyond (up to and including other forms of archives or data collection) are of importance to and questioned by young artists. For the art students involved, the access to these data sets provides an intriguing provocation to explore interdependencies of notes from the past with current artist interests and contemporary concerns. In this setting, the scientific knowledge base provided by the library and dataset experts as part of the workshops, as well as the artistic guidance by the invited advisors are weaving a net that supports the creative process of art work creation.

Thinking further about these processes of connection is about relationships between people, data, and their spaces. It is about the in-between that represents these connections and gives meaning to the state of being in-between. In the in-between, time and space connect, and data can be "re-located" and thus expressed in new contexts and artworks.

The results from the ONB-Labs Art Program will be presented in the ONB Labs Artspace as part of a finissage, scheduled for May 2023. The Labs team will also organize a webinar and a workshop among library staff members within the Austrian National Library and the Austrian library community in order to encourage other libraries to run art programs as well. The first step definitely is building awareness about the value of artistic use of library archives. We are convinced that project advisors and mediators play a crucial role in connecting library staff with artists or art students, with data, objects and with the respective online and offline spaces and vice versa.

Conclusions

As mentioned at the beginning of this paper: VR technologies and the virtual environment as a space for organizing and displaying archival data have already been tackled by artists and researchers such as Tiago Martins, Christa Sommerer and Laurent Mignonneau [19]. With this research we move on and are questioning not only the virtual space but moreover how contemporary forms of organization and online representation have influence not only on the way the archive can be read but also which new contexts and connections can be found within the data provided. Archiving the In-betweeen, making the in-between readable, connectable, contextable and open for participation in the digital archive realm. The ONB-Labs Artspace in this setting holds the very unique position of making artworks that originate from digitized analog archive data accessible through a digital native platform, and simultaneously growing into a dedicated New Media Art Archive itself.

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Authors Biographies

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Exploring the Digital Archive as a Thinking Space –

AI Aspects on Documentation, Access and Knowledge Discovery

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Abstract

Most digital archives still provide access through phonebook-like lists. But the digital archive is a *living (data) culture*. An artificial intelligence chatbot predicts that the digital archives of the future will improve the user experience. More than 20 years ago, however, the authors developed the media art archive platform netz-spannung.org (1998-2010) with *Knowledge Discovery* tools such as the *Semantic Map, Media Flow* or *Matrix*, which enable an *interactive* and *performative* engagement with the archive. This approach allows visitors to become active participants and co-creators of the archive's content rather than passive viewers. It is not primarily about finding familiar information, but about searching and browsing in unfamiliar contexts. The goal is to create a *participatory experience* that encourages visitors to become *data performers* in a walk-through *thinking space* and to acquire new knowledge without handing over their own thinking to the automated machine.

Keywords

Audio, data performer, interactive, interface, knowledge discovery, living data, mapping, participatory experience, performative, semantic, serendipity, thinking space, visual, walk-through.

Introduction

When asked about the future of digital archives, one AI responded that "they will be more accessible and user-friendly, with advanced search and organization tools. They may also include more multimedia content, such as video and audio recordings, and use virtual and augmented reality technologies to enhance the user experience". "It is also possible," continues the apparently retarded AI, "that digital archives of the future will be more integrated with other technologies, such as artificial intelligence, to make it easier for users to find and interact with the information they need." So much for ChatGPT in January 2023.

The authors are co-founders of ART+COM[1] (1987) in Berlin and have several years of experience of working with artificial intelligence. Their VR work *Home of the Brain* (1990-1991) juxtaposed the concepts of the antipodes of artificial intelligence-*Marvin Minsky* and *Joseph Weizenbaum*-with the concepts of digital culture of *Vilém Flusser* and *Paul Virilio*.

Figure 1. In memory and gratitude to *Peter Weibel*, who presents *Media Flow* (2006/08) at the ZKM as one of the "*groundbreaking*" *Knowledge Discovery Interfaces*. 2012 © Fleischmann & Strauss

To select these four thinkers, they listened to *Minsky's* provocative lectures and discussed them with *Sherry Turkle*. *Joseph Weizenbaum* accepted an invitation to the *Memoria Futura*[2] symposium at the *GMD*, then Germany's leading *IT* research institute, where discussions with online

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[1] In 1987, *Fleischmann & Strauss* joined forces with *Edouard Bannwart*, the principal founder of ART+COM. From this *think tank* in Berlin, they planned and carried out their first research projects in the field of *digital culture*. In 1992, they were invited as guest researchers and fellows to the GMD German Research Center for Information Technology in St. Augustin/Bonn and the KHM in Cologne. One year off turned into 22 years.

[2] The symposium *Memoria Futura* (1999) used a networked mixed reality situation to visualize a memory space of collective experience. The additional *i2TV* format of community television, comparable to today's *ZOOM*, was developed in the *MARS* lab under the direction of Monika Fleischmann.

participants (*i2TV*) in a *mixed reality* situation were held for the first time. [14] They exchanged letters with *Paul Virilio* and represented him at a symposium in Lisbon. *Vilém Flusser* looked forward to working with them, but sadly he died shortly afterwards.

In 1992, together with the *VisWiz*[3] research group, they began experimenting with AI algorithms, including neural networks and image alienation, on supercomputers such as *Thinking Machines' Connection Machine CM2*. In the mid-1990s, they expanded their work with the *MARS*[4] *lab*, first at the *GMD Institute for Media Communication*, and since 2006 at the *Fraunhofer Institute for Artificial Intelligence and Robotics*. In a walk-through thinking space, the authors exhibit their AI instruments as works of art that allow visitors to become data performers. But staging an online archive is not just staging something, but also staging someone who uses the archive.

The Performative Interface: Advanced Concepts of Presentation and Representation

The *digital archive* is not a rigid filing cabinet. Instead it should be a *networked*, *living* (data) *culture*. One of the first networked archives - *netzspannung.org* - had been in beta testing since 1999. The development of the underlying distributed technology and the creation of the first content took two years. It was launched in 2001 at the CAST01 [15] conference at GMD's *Birlinghoven Castle* in Sankt Augustin.

At about the same time, two other archives were founded in Germany with the aim of preserving *Media Art from the 1980s and 1990s*, at least descriptively, because it was in danger of being lost due to outdated software and hardware. *Oliver Grau* started the digital archive ADA, which he initially curated as a research collection focusing on the compilation of extensive documentary material as an expanded notion of documentation and developed further as a collaborative project with international media artists, researchers, institutions, and an editorial team. [7]

Dieter Daniels and *Rudolf Frieling* had created the *Media Art Net*, a self-contained digital network of artists' works curated by invited experts on media art topics. Their focus was on organizing data for specific information and a narrative approach to organizing thematic content. [8]
Monika Fleischmann and *Wolfgang Strauss*, the authors of *netzspannung.org*, took a different approach. They involved an editorial team, university partners, publishers, and community experts. To organize the growing database and gain new insights, they developed *Knowledge Discovery Interfaces*. The goal was to represent the relational network as a digital information space. Another focus was to enable

participants to search and find information in an online archive without prior knowledge or the help of an archivist. This seemed possible only with a *Performative Interface* as a *knowledge tool*. [9]

There are basically two types of access to electronically stored data: "*sharp*" searching and "*unsharp*" browsing. *Searching* requires prior knowledge. People must know what they are looking for. *Browsing,* on the other hand, is inspired by what is presented to the researcher. The basis of browsing is precisely "*not knowing,"* which becomes "*felt*" knowledge during the browsing process. The maxim of the industrial interface is "*what you see is what you get*". In contrast the authors *Performative Interface*, reverses this and reveals what is hidden: *what you get is what you did **not** see*. [2] This is where the *process of learning* begins.

The *Performative Interface* is a special feature that leaves room for improvisation and interpretation. [3] In particular, it is designed to encourage participants to respond to the evocative language of the interface. Wondering about something that becomes visible through one's actions creates a new space for thinking. The *Performative Interface* heralds a *paradigm shift*, namely the *symbiosis of natural and self-learning systems*. As a counter-model to the black box of *Artificial Intelligence* (AI), the authors pursue the concept of *Intelligence Augmentation* (IA), which emerges from a *symbiosis of self-learning systems* based on *natural* and *artificial intelligence*.

Netzspannung.org - a Junior "Mother of All Demos"

Research and development for building an archive for media art began in August 1998 with the project CAT - Communication, Art, Technology. A year earlier, in 1987, 120 international media artists participated in an *e-mail survey* on the characteristics of an *Internet platform for media art*. The authors' feasibility study was the program for its realization.

The platform *netzspannung.org* was envisioned as an online resource, producing and providing telelectures, pedagogy, scholarly essays, and media art documentation based on shared, distributed server systems. [5] The platform was developed in two years by the editorial and technical team. It had four curated content channels and an open community channel. It publishes a print magazine, the *netzspannung Journal*, organizes symposia such as *Memoria Futura*, conferences such as *CAST 01*, workshops such as "*I see what you hear*", the biennial student competition *Digital Sparks*, broadcasts of *Tele-Lectures* by renowned experts, a community profile system [10], and finally the archive itself. All in

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[3] The *VisWiz* research group was founded in 1992 by *Wolfgang Krueger* (formerly *ART+COM*) at *GMD - the German National Research Center for Information Technology* (1968-2001) and was headed by *Monika Fleischmann* after his death.

[4] *MARS* (Media Arts Research Science) was a department at the *GMD,* later *Fraunhofer Institute for Media Communication*, founded by *Monika Fleischmann* in 1996. It was presented as one of the top 15 labs for media arts and research at *ITAU Cultural* in *Sao Paulo* in 2002. https://idw-online.de/de/news51440

all, an art and science laboratory on its way to becoming a collaborative publishing and development house.

The *Digital Sparks* university competition was conducted online via the platform, while jury meetings and award ceremonies took place on site in partnership with festivals or events at Ars Electronica, EMAF, GMD's Schlosstag or the ZKM. [11] In collaboration with committed partners, the platform quickly compiled a comprehensive collection of media art educational materials with world-renowned speakers from a wide range of disciplines for example on the *Arts of Knowledge[9]*.

Figure 2. First sketch of *netzspannung.org*, 1998. Worldwide connected, 2006. Homepage, 2001. Streaming Hypermedia Telelecture 2004. *Otto's Mops* - i2tv, 2002. © Fleischmann & Strauss

The platform was first presented to the public at the *CAST01* conference at GMD's Birlinghoven Castle as an instrument for researching, reflecting on, and mediating electronic culture. [15] For this occasion, a *Mobile Streaming Unit[10]* (2001) was developed, a portable webcast studio with easy-to-use streaming software that enabled the MARS team to record lectures with prominent speakers and broadcast them to German universities and live on the Internet, such as the *Burda Academy's* "*Iconic Turn*"[11] series from the University of Munich. These events were recorded and stored long before the advent of *YouTube*.

A prototypical educational format was the *Hypermedia Tele-Lecture*. It consisted of linking two different online archives - *netzspannung.org* and *Media Art Net* - and making the resources available to the community. An exemplary *Tele-Lecture* on "*Sound and Vision*" (2004) was produced in collaboration with the art historian *Dieter Daniels*. [12] A first *netzspannung.org video* from 2004 shows the activities of the *MARS* team in this comprehensive archive project.[13] The number of hits had risen sharply, and in 2006 the platform recorded 150,000 visitors per month, which corresponds to the number of students at the Berlin University of the Arts at that time. More than 3,500 works by over 500 artists.

The knowledge productions of netzspannung.org were presented from 2007 to 2009 in the exhibitions "YOU_ser: The Century of the Consumer" and "The Celebration of the Consumer" at the ZKM Karlsruhe, as well as the 2012 solo exhibition "Inter-Facing the Archive", dedicated to knowledge discovery, curated by Peter Weibel.

At the request of the authors, netzspannung.org moved from the Fraunhofer to the ZKM as its new host in 2010. [12] Technically, the platform was under development from 1999 to 2001, with further update in 2004 and 2010, before being handed over to the ZKM in the same year.[14] Netzspannung.org is still accessible, outdated parts are to be restored. It is worth mentioning that the platform has been hosted and maintained by ZKM as a virtual server since 2012. But it also means that the archive itself is archived, virtualized. It's a frozen time capsule, still accessible but no longer active.

Faces of the Archive: Knowledge Discovery interfaces for browsing the Thinking Space

The authors developed *rhetorical figures of data presentation* to extend the experience of searching and finding in a growing archive, but above all to provide orientation and an overview of the content. The knowledge discovery interfaces are designed to allow participants to search for information and discover knowledge. They follow mental models such as the "*map*," the "*jukebox*," and the "*flow*" by linking artworks and lectures, artists, and scholars.

All developments were tested and discussed in workshops with other experts. This included the role of viewers and their use of the archive. In addition to the authors and the MARS team, *Annette Huennekens, Golo Foellmer, Christiane Paul, Alfred Rotert* and others took part in the workshops at the *GMD's Birlinghoven Castle*, e.g., on the topic of *Timelines, Clusters, Knowledge Maps*.[21] It was a learning

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[9] The *Arts of Knowledge* events organized by the *Zentrum für Literaturforschung*, Berlin. netzspannung.org/tele-lectures/series/en

[10] The Mobile Unit or Mobile Streaming Lab was developed at MARS by Predrag Peranović under the direction of Monika Fleischmann & Wolfgang Strauss, 2001. bit.ly/OnlineMediaLab

[11] *Iconic Turn - The New Image of the World*, 2003, www.hsozkult.de/event/id/event-52577, *Iconic-Turn Live-Streaming,* 2003 www.nettime.org/Lists-Archives/rohrpost-0306/msg00170.html

[12] *Sound and vision in the avant-garde mainstream* by Dieter Daniels, a *Hypermedia Tele-Lecture* by Monika Fleischmann, Wolfgang Strauss and Fraunhofer MARS Lab 2004 http://netzspannung.org/tele-lectures/hypermedia-lectures/

[13] *netzspannung.org - Media Art Archive – Video* (2004) Monika Fleischmann & Wolfgang Strauss bit.ly/netzspannungVideo

[14] Media art portal "netzspannung.org" moves to ZKM, 2010. https://idw-online.de/de/news402889

[21] *Timelines, Clusters, Knowledge Maps*. Collaborative structures for networked knowledge spaces. Workshop by MARS Lab at

process for all involved at a time when there were hardly any role models.

Thinking Space #1: The Semantic Map - a Radar System for Navigating the Data Cosmos

The *Semantic Map* (2001-02) locates archive entries and makes semantic relationships visible. [13] The self-organizing map uses semantic text analysis to reveal the relationships between text documents by generating keywords, identifying similarities, and grouping them into thematic clusters. The map shows in which conceptual environment a document is located and which other documents are most similar. The documents of an individual work appear as nodes in a network of thoughts, themes, and practices. The "*reader*" discovers information through differentiation and thus becomes a co-producer of meaning.

Figure 3. Semantic Map - Level of Detail, 2001-04. © Fleischmann & Strauss

The experience of browsing the *Semantic Map* is similar to walking through an exhibition, where the viewer sees more than just an isolated object. The *Semantic Map* represents the digital archive in a way that goes beyond the individual object and presents it as a *virtual cartography*. It aims to break down fixed categories and enable associative thinking. The *Semantic Map* is created using a *semi-automated artificial neural network* that changes its appearance with each new entry added to the database. The calculation iterates. Every new entry changes the map. This is an interface designer's nightmare, as it fails to place constants. But it allows the visualization of media art as a radar image of current events. *Roger Malina* describes the *Semantic Map* as a

visual system for the data cosmos. It has been shown internationally, including in the exhibition "*Resonance: Looking for Mr. McLuhan*"[23] at the *Pratt Manhattan Gallery* in New York City, curated by *Berta Sichel*.

The *Semantic Map* is an example of how humans and machines can work together in an *intelligence-amplifying* (IA) way, rather than being increasingly dominated by a black box of *artificial intelligence* (AI).

Some viewers were outraged that the map looked different every time they came back. Then they understood that's what it's all about. With each new project added to the archive, the size of each blue island and its position relative to each other changes, just as the relationships between them change as the archive grows. The S*emantic Map* is an invitation to active reflection on the new relationships.

Thinking Space #2: Navigating Databases with the Matrix Magnifier

The interface of *Matrix Magnifier*[25] (2005) follows the idea of a jukebox. It is based on the *Bubble Map* principle by *Ben Shneiderman*, who was inspired by the paintings of *Piet Mondrian* and their rhythmic lines. *Bubble Map* is a method of representing hierarchical data structures in the form of nested rectangles.
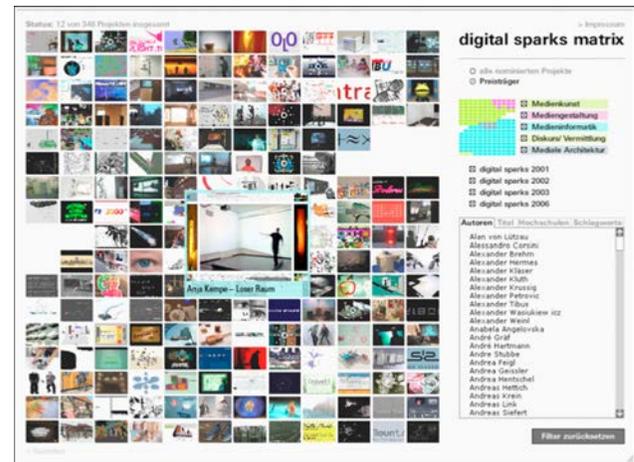
Figure 4. Matrix Web-DVD Interface, 2006. © Fleischmann & Strauss

Each rectangle represents a different data element in the digital archive. The magnifying glass allows viewers to zoom in and see additional text, images, and video related to the project. A subtle crackling sound accompanies cursor movements and clicks as an object is selected and the image is magnified. The DVD was distributed to the participating

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GMD's Birlinghoven Castle, Sankt Augustin, Germany. http://netzspannung.org/about/workshops/knowledgemaps/en

[23] *Semantic Map* in *Resonance: Looking for Mr. McLuhan*, NYC, 2011. https://resonancelookingformrmcluhan.wordpress.com/artists-2/monika-fleischman-wolfgag-strauss/

[25] Matrix Magnifier: Browser for exploring multimedia databases using gesture driven PointScreen technology by Wolfgang Strauss, Monika Fleischmann et al. Mensch und Computer 2006, (Ed.) HM Heinecke and H. Paul, München: Oldenbourg, pp. 411-418.

universities as a teaching tool. It had a first print run of 1000 copies. The *Matrix* DVD of the *Digital Sparks* competition entries is designed to work like an app for the database. It is viewed on a computer connected to the Internet and set up as a classroom learning environment. Combined with *PointScreen,* a *Minority Report*[26] interface, the *Matrix Magnifier* was exhibited as a contactless driven installation on the topic of *Knowledge Archives* (2008) at the Edith Russ House for Media Art in Oldenburg and in YOU_ser (2007-2009) at the ZKM Karlsruhe, curated by *Sabine Himmelsbach* and *Peter Weibel*, respectively.

The gesture-driven matrix, even more than the mouse-driven screen application, is the embodiment of the *serendipity* pattern of accidental discovery. It is the serendipitous observation of something not originally sought as a new and surprising discovery. Here we find a link to quantum chance through *serendipity*. Chance is the backbone of quantum technologies today in quantum entanglement. Serendipity becomes a parameter for the ability of an information system to find useful information despite an overabundance of data.

Figure 5. Touchless *PointScreen* with *Matrix*, 2006 © Fleischmann & Strauss. Inspired by *Theremin* creator Lev Thermen, 1917

PointScreen was also a preview of the post-pandemic interface. You want to avoid touching anything unnecessary. PointScreen captures the electrostatic aura of the visitor, reversing Walter Benjamin's question about the aura of a work of art. Now it is the electric aura of the human being that is of interest. *PointScreen* is a *biosensorial* interface that can measure the neuro-biological state of the human being.

Thinking Space #3: Media Flow – the Transformative Power of the Flow
Thoughts in flow, that's what the *Media Flow*[27] (2006) stands for. The interface displays parallel streams of images

and words running across the screen, allowing the viewer to easily access and browse a large collection of media, such as images and documents. Projects and people, as well as titles, authors, and keywords from the entire archive stream move before our eyes. The terms are spoken by computer voices using text-to-speech technology.

Figure 6. *Media Flow* Browser layers, 2007. © Fleischmann & Strauss

A large archive with thousands of documents is usually impossible to understand at a glance. With *Media Flow*, it is a matter of minutes. Zooming allows for flexible search and retrieval and brings related documents to the forefront. The reader selects individual terms like loose threads in a fabric, and guided by his or her own associations, new knowledge emerges.
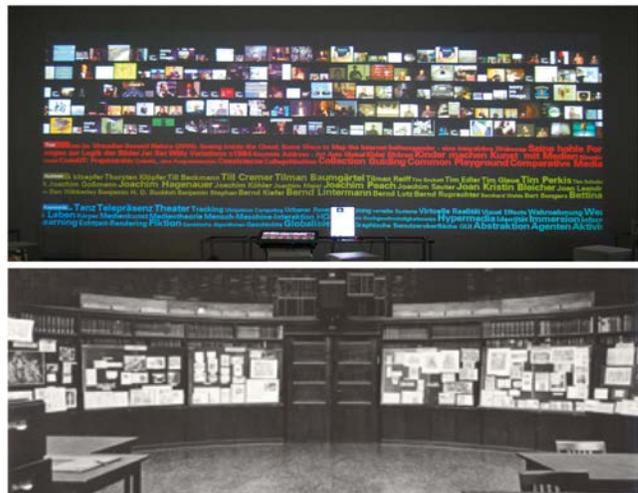
Figure 7. *Media Flow* installation, 2007 © Fleischmann & Strauss. Commemorating *Aby Warburg's Thinking Space*, 1925.

There is a surprising visual similarity between *Media Flow* and *Aby Warburg's Denkraum*, 1925 (Thinking Space) became apparent. It is the spatial installation of *Media Flow*

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[26] PointScreen - Minority Report Interface (2003).
bit.ly/PointScreenMinorityReportHCI

[27] Media Flow (2006 / 2008) by Fleischmann & Strauss, Video,
bit.ly/MediaFlow-Medienfluss

that transforms the digital archive into *a space of thought in motion*.

An important part of the exhibitions are encounters with students and their teachers, who can drop in and give ad hoc lectures using the media flow installation, as in ZKM, or teams of researchers getting to know each other while doing research, as in the exhibition "*WissensArchive*" in the Edith Russ Haus Oldenburg. Participants not only retrieve information from the database, but also process it directly and interact with the archive browser and other visitors.

Figure 8. *Media Flow* - Learning Environment 2007.
© Fleischmann & Strauss

The installations have been the subject of major solo exhibitions at ZKM Karlsruhe, Museum Weserburg in Bremen, Laznia[28] in Gdansk, Poland, and in Shenzen China between 2006 and 2011.

Looking at Aby Warburg's "Denkraum" – the archive as a space for thinking

Can *Aby Warburg's* way of thinking be considered a precursor of artistic positions dealing with digital information overload? The art historian *Daniel Becker* has discovered affinities between Warburg's picture atlas *Mnemosnye* and the online platform *netzspannung.org*, which aims to encourage the creation of new connections and relationships by browsing through the database.

In this respect, the work resembles the atlas in that connections and links lead to a genealogical process of knowledge formation. The participants are given a crucial

position in this process: They can create their own new relationships.[29] *Becker* notes that the authors address the issue of information being consumed ad hoc and no longer reflected upon. "Yet Fleischmann and Strauss deal with precisely this problem in their works." Their work "consequently enriches the discourse around collections of knowledge, as the focus here is not – as with classic archive research that is connected with prior knowledge – on the targeted search, but rather on rummaging and finding. This affirmation of media-genuine 'surfing' in the sea of data of an online database registers in a long history of concepts about memorization, archiving, and data collection."[30]

It is not primarily a matter of finding known information, but of searching and browsing in unknown contexts. The database interface, in which the process of linking by the participant becomes relevant in a kind of contemplation, perhaps digitally updates *Aby Warburg's thought space*. A form of intelligence amplification takes place.

The performative interface creates a space where relationships can be actively experienced rather than merely represented. The authors see the interactivity of the performative interface as a contemporary strategy "to aesthetically intervene in the internationally operating media industries and to create a third space between the poles of fusion," as *Yvonne Spielmann*[31] puts it, a space of thinking. The performative interfaces introduce a participatory role for the viewer as a data performer, the viewer becomes a "theorist" through his or her action or reaction, demonstrating what the displayed material evokes in him or her. In this way, the archive becomes a thinking space, a place where thinking is done by doing, and connections are made by observing.

Conclusion

The knowledge discovery interfaces created by *Monika Fleischmann & Wolfgang Strauss* in the early 2000s were early manifestations of the emerging *Information Arts*[32] (2002), as described by Stephen Wilson in his book of the same name. Since then, other advanced interface solutions have emerged. But in 2009, a visitor to the *Ars Electronica Center* remarked that she "couldn't understand anything anymore" when navigating a cloud of millions of pieces of data. Much work remains to be done, and the question remains as to how AI should be used to further explore *the digital archive as a space for thinking*.

Nevertheless, the *Semantic Map* (2001/2004) was one of the first interfaces to show new patterns of *searching and finding* in the *Thinking Space*. Section *Thinking Space* #1

[28] Performing Data - Monika Fleischmann & Wolfgang Strauss, Katalog by Laznia Centrum, Gdansk, 2011. www.researchgate.net/publication/224904108_Fleischmann_Monika_Strauss_Wolfgang_Performing_Data

[29] Becker, Daniel. 2017-01-09 Atlas or oracle? The concept of the archive between Warburg and the online database. https://zkm.de/de/magazin/2017/01/atlas-oder-orakel

[30] cf. Becker, Daniel. 2017

[31] Yvonne Spielmann Hybridkultur, 2010. www.suhrkamp.de/buch/yvonne-spielmann-hybridkultur-t-9783518295724

[32] Other major writings of the time: Lev Manovich, "The Language of New Media" (2001), Oliver Grau, "Virtual Art: From Illusion to Immersion" (2003), Christiane Paul, "Digital Art" (2003), Roy Ascott, "Telematic Embrace" (2003), Edward A. Shanken, "Art and Electronic Media" (2009).

describes this process. The *Semantic Map* combines concepts of Artificial Intelligence AI and *Intelligence Amplification* (IA). Computer scientist *Frederick Brooks* argues "that intelligence amplifying systems can, at any given level of available systems technology, beat AI systems. That is, a machine and a mind can beat a mind-imitating machine working by itself."[33]

Based on elementary forms of *artificial intelligence*, such as an *artificial neural network* for *semantic text analysis* and *Kohonen mapping*, all presented archive interfaces are realized as two-dimensional interacting layers. Time-based *semantic surfaces* act like a skin of the archive. They were created with the above-mentioned technologies from a data volume of about 100 megabytes, which took days and weeks to compute and monitor due to the computing power available at that time. Therefore, the attempt to represent multidimensional structures was abandoned.

The authors work on the shift from the industrial to the performative interface. From "*what you see is what you get*" to "*what you get is what you did not see*". While the *Semantic Map* focuses on the interactivity between the participant and the networked information, the *Media Flow* application demonstrates media-mediated communication between participants, as described in *Thinking Space* #3.

AI methods can be used to better organize and classify content in the digital archive, making it more of an *interactive thinking space*. For example, *natural language processing algorithms* could automatically tag media files and categorize them based on content and context, as shown in the *Semantic Map*. This would make it easier to search and navigate the archive. It would help discover and explore unexpected connections and relationships.

Finally, as *thinking spaces* within the archive, AI could be used with virtual and augmented reality to create immersive, interactive experiences. An artificial neural network that automatically learns from training data would be implemented as a thinking space in the archive. For example, machine learning algorithms that can automatically learn from training data could be implemented to generate interactive, walk-through exhibits of the archives. Archivists could leave knowledge traces in the archive for other staff as they use it. Visitors would be surrounded by a 3D learning space. The archive would become a learning space not only for the learner, but also for the Media Flow interface. Both would evolve and "learn" through performative actions.

What's unique about ChatGPT's AI is its ability to combine natural and artificial intelligence. The interactivity of the operator plays a particularly important role in the quality of the survey. However, caution must be exercised in the use of information, given the proliferation of misinformation and fake news. It is also important to consider the need for diversity and inclusion in the development of AI, as well as the cultural attitudes and political leanings that go into programming and training AI. Another issue with AI is its energy consumption, which will contribute to the climate crisis, and the potential for AI-generated content to deceive and defraud creators and consumers. If humanity is to avoid a further acceleration of the climate crisis and a senseless plunge into the abyss, energy-efficient computing alternatives must be adopted. As a society, we need to decide whether we want to continue to automate, or whether we want to sharpen and strengthen our own intelligence and develop spaces for cross-disciplinary thinking.

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Authors Biographies

Monika Fleischmann (*1950 in Karlsruhe) and Wolfgang Strauss (*1951 near Nuremberg) are a German artist duo who have been working with digital media as a combination of art and technology since the mid-1980s. They founded their ARTWORK studio in 1987 and co-founded the ART+COM Institute for interdisciplinary research in Berlin; established the MARS - Media Art & Research Studies Lab at GMD Institute for Media Communication and Fraunhofer Institute for AI and Robotics. Their pioneering work began with "Berlin-Cyber City" (1989) and working with maps of the city as part of the research project "New Media in Urban Space" was the impetus for further ART+COM projects, that led to the dispute with Google Earth depicted (not entirely accurate) in the Netflix series "The Billion Dollar Code". They have received numerous awards for their pioneering work, including the Golden Nica of Ars Electronica (1992) and the SIGGRAPH Lifetime Achievement Award in Digital Art (2018). Their focus is on the "Virtual Denkraum" and the power of images in shaping our perception of the world, with a specific interest on 'performative interface' as a tool for knowledge discovery and creation through interactivity.

From self-documentation to federated querying using Wikibase: a new topology to Media Art Archiving?

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Abstract

Traditionally, domain datasets such as media art exhibition records and collection records are managed and published by archiving or research institutes. However, it is rare for an institute to compile or possess an entire exhibition history of an artist before his archive enters its custody. This paper provides an alternative paradigm in which artists may self-document and publish their creative history using the easy-to-use Linked Open Data suite Wikibase. This paper also argues that self-documentation is a two-for-one endeavour where artists can consolidate their CVs while the archiving and research communities will have access to a distributed archive.

Keywords

Artist as Archivist, Linked Open Data, Big Data, Graph Database, Backend for Media Art, Self-documentation, Community-driven Archiving, Distributed Knowledge Making

Introduction

This paper is built upon two previous works from the ISEA New Media Art Archiving Submit: *Preservation Begins at Creation: Integrating an Embedded Digital Archivist Within an Academic Media Art Program* (2020) and *Interconnecting Archives: Paving a Path Forward* (2022).

In the first work, the author argued that media artworks are unlikely to be preserved and documented by archiving professional before it enters the custody of an art museum. As a result, their associated digital artefacts might be kept in unarchival, obsoleting formats, challenging their future conservation and restoration. To counter this, the author promoted the concept of *preservation begins at creation*, in which media artists should be coached with archiving knowledge to perform preliminary preservation. [1] This paper extends this "Artist as Archivist" idea by advocating *self-documentation by artists*. Through the process of curating the Artist's CV in *Linked Open Data* (LOD), artists can benefit from the extensibility and reusability of the data created in their websites or art projects, while the archiving and research communities may be benefited by improving intergraph technologies, such as SPARQL federated query.

In the second work, the programmers from ISEA, SIGGRAPH, and FILE developed a system to connect people and events that are common in the respective online databases, enabling users to discover further information through hyperlinks. [2] This paper suggests that, with artists' data available as LOD, "Connecting Archives" can stretch deeper into artists' websites/endpoints.

This paper first discusses why self-documentation by the artist is desirable and necessary. Next, we will illustrate why we choose LOD technologies as our data backend and how LOD technologies benefit an artist and the archiving and research communities.

Motivation: Typical Use Cases

Data Management for the Artist Portfolio

The origin of this paper stemmed from the data management challenge of the Jeffrey Shaw Compendium, the portfolio, the retrospective project, and the future SPARQL endpoint of the Australian media artist. [3] Beginning in 2015, the Compendium was first built using a conventional content management system (CMS) as a website and the supporting installation during *Prix Ars Electronica 2015*. [4] Initially, it consists of webpages, images, videos, and credit information of about 100 selected works.

A major edit was made to the Compendium website right after *Prix Ars Electronica*. Exhibition records of the 100 works were reconstructed from archive documents, ephemera, and catalogues and are ready to be added to their respective page. Instead of adding the exhibition records as text, we determined to store the records in a relational database and generate the records via a function call. In such a way we can also generate the artist's CV using the same data source with another function, avoiding the problem of inconsistency and redundant work to synchronize information.

Expanding Application and Data Model

In 2019, the Compendium was presented at Enghien-les-Bains, France, with a different layout customized for the exhibition. [5] Instead of data export and import, we wanted the on-site instance to access the live data of the Compendium, in such a way that any update on the main Compendium is reflected on the installation instance. We migrated

our data from the relational database to Google Sheets for two reasons. 1) Easier to add new columns / adjust schema to reflect new application needs, 2) Google Sheets is web-native and thus, when configure correctly, is more secure and reliable for retrieving data from remote locations using its API.

Figure 1. Jeffrey Shaw Compendium, *Passé Augmenté x Présent Augmenté*, Arts Center of Enghien-les-Bains, Enghien-les-Bains, France, 2019

Meanwhile, mass digitization and archival research of the Jeffrey Shaw Archive resulted in an immense growth of data and metadata. Apart from exhibition records, we now have records about lectures, conferences, museum collections, interviews, publications, and descriptive metadata for various kinds of media, such as video tapes, floppy disks, and computer tapes. Along with descriptive data, we also saw a growth in relational data. For example, a publication can be supporting evidence for an exhibition event or a citation for an artwork. Our existing Google Sheets data source is becoming more and more clumsy to adjust its schema to fulfil future data curation needs.

Supporting Media Art Project

As Lev Manovich pointed out, "the database becomes the centre of the creative process in the computer age." [6] The emergence of mass digitization, advancement of retrieval and interactive technology has brought further a new genre of interactive art that centers on the performance, navigation, and interpretation of archives. [7] I describe this trend as a movement from data(base)-driven media art to archive-

Figure 2. *The Infinite Line* illustratively demonstrates a strategy to "let the archive speaks". The installation gives visitors the opportunity to recombine the poetic ensemble of Edwin Thumboo, using the actual recital recording from the poet. [8]

driven media art. Developed from the archival principles of respecting provenance and evidence, this genre of art strives to "let the archive speaks". Consequently, new aesthetics and strategies emerged to "interface" the content and context of an archive collection.

Originally conceived to support the artist's retrospective exhibition, the database of the Compendium pre-version was first employed as an exhibition backend in 2013 as *Touch-table*. In this installation, the audience could browse the dual archive of Jeffrey Shaw and Hu Jieming, exploring image and video documentation of a chosen theme or keyword. [9] The limitation of the 2013 iteration is that the content is organized with a few handcrafted keywords and themes by the respective artist. The next iteration of the artist's retrospective project may include a richer dataset, stretching from temporal, spatial, thematic, people or sensory features (e.g. colour, contrast). In this respect, our existing database backend is not powerful enough to cater to the description and query requirements.

Figure 3. *Touch-table*, Jeffrey Shaw and Hu Jieming Twofold Exhibition, Chronus Art Center, Shanghai, China, 2014

Self-documentation in Linked Open Data

Requirement Specifications of the New Database

- NoSQL, graph, non-tabular database.
- Open Standard.
- Enrichable.
- Queryable.
- Web-native

NoSQL ("Not only SQL") refers to a collection of next-generation database systems developed from the big data challenge. Among various types of NoSQL databases, we are particularly interested in graph databases because of their flexibility and superiority in describing relationships. In a typical relational/tabular database (often also referred to as RDBMS, SQL database), the database engineer needs to define what attributes ("the columns") to be included to describe a collection ("the table"). Designed to handle

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transactional data, relational databases assume items/records ("the rows") to be homogeneous. This works well in an institutional context if the collection departments are divided according to medium. In our case, to describe the artworks of an artist who works in a diverse medium, attributes may not be consistent across these artworks. For example, "duration" is irrelevant in non-time-based works and "software engineer" is irrelevant in performance or architectural projects.

In a graph database, data is represented as interconnecting nodes and edges. Essentially, there is no structural imposition that an attribute must exist for a node, nor how many times such attribute is attached to a node. Moreover, when a new attribute is added to a node as an edge, no structural change to the database is needed, in contrast to an SQL database in which the table structure must be changed.

Another advantage of a graph database is spontaneous relationship creation. To create a relationship in a relational database, such as linking an artwork and its collaborators, a relationship table containing artwork and actor ID should be created. In a graph database, adding a relationship is as simple as linking an artwork node to an actor node via some "collaborator" edge. As a result, there is no structural change needed to add a new relationship. As a result, we can then implement new relationships without changing the database structure. Selecting a database with open standard is desirable. Disclosure, documentation, community adoption levels are the keys to the sustainability of the chosen database.

Enrichability refers particularly to the ability to connect, align and reconcile with public datasets to download new attributes. Data enrichment will enable us to step closer to curating an operable, programmable high-quality dataset. For example, reconciling a text-based location name to a unique ID on a geolocation database allows us to retrieve GPS coordinates for map visualization.

Queryablility refers to the capability to return a result set from a structured, general-purpose query like SQL. Web-native refers to a database package with an abstraction layer to provide an interface for building web applications, including websites, web apps, and custom exhibition applications. These two features are important to us as we aim at building websites and applications on the reworked database.

Linked Open Data

Many of the above requirements are satisfied by Linked Open Data (LOD) (also known as the Semantic Web), a concept conceived by Tim Berners-Lee. [10] First, LOD employs an RDF graph as its core data structure which is NoSQL and non-tabular. Created by the World Wide Web Consortium (W3C), RDF (Resource Description Framework) is a framework for representing information in the Web which has gained popularity in Library Information Science and Digital Humanities. [11] In RDF, data is represented by triples where each triple is a statement of three parts — the subject, the predicate, and the object — essentially replicating the node-edge schema of a graph database.

RDF requires triples to be represented by HTTP URIs (Hereinafter referred to as the 'URIs', for brevity).
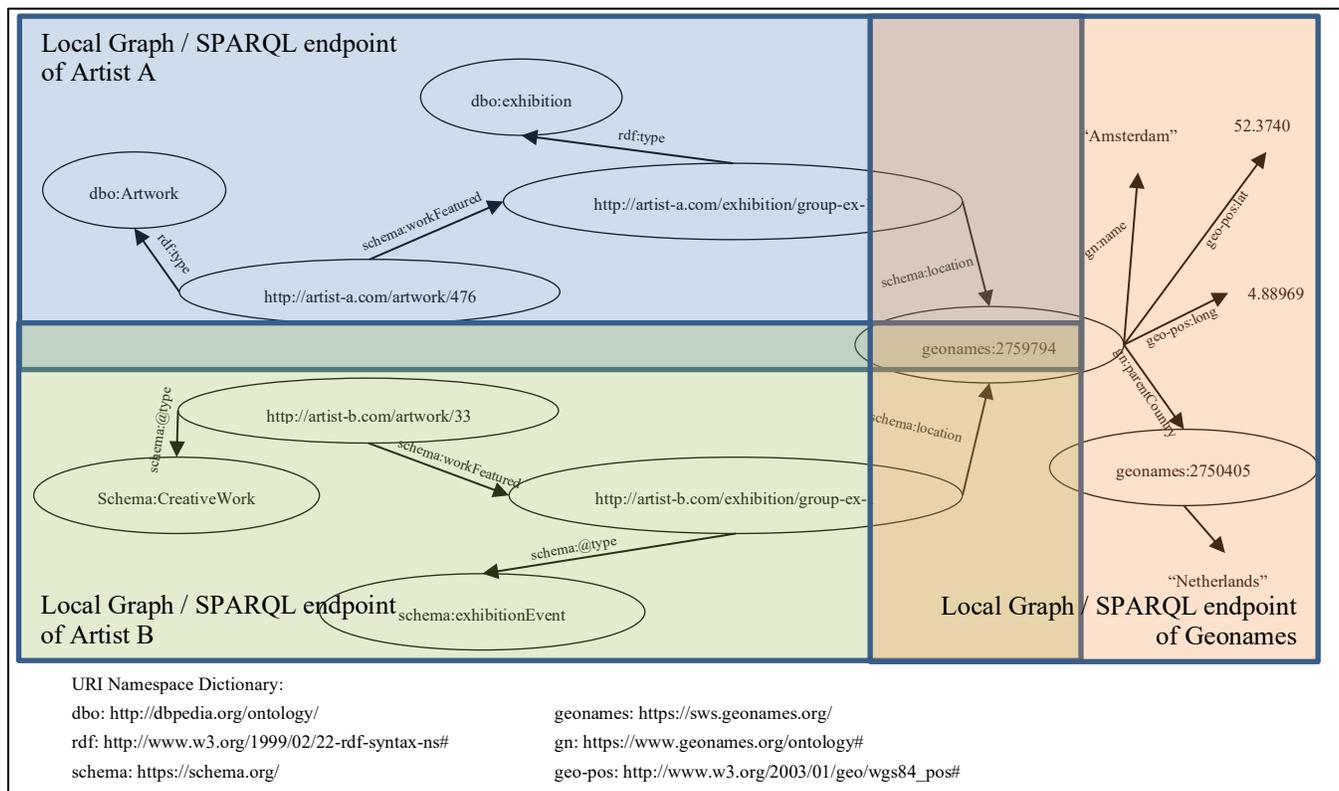
Figure 4. In the topology of federated querying, each data owner (Artist A, Artist B, Geonames) publishes and maintain their graph data.

Structurally, a URI comprises a domain and a path. For example, in Figure 4, "http://artist-a.com/artwork/476" contains the domain "artist-a.com" and the path "/artwork/476". In the RDF schema, the domain represents namespaces while the path represents a resource in a namespace. Fundamentally, a resource can be any concept, or any "thing", such as "artwork", "exhibition", "person", or "event", followed by a unique identifier, while namespace/domain partitions the web-scale database into separate graphs. Effectively, "artwork/476" of "artist-a" is different from "artwork/476" of "artist-b". Furthermore, "artist-a" and "artist-b" may describe their data according to their own needs by choosing relevant attributes/predicates.

Predicates are also represented by URIs. There are many community projects (some examples are listed in Figure 4) providing terms to name predicates. One example is "https://schema.org/workFeatured" (shorthand schema.org:workFeatured) from the Schema.org project/namespace. Accessing this URI with an internet browser one can find its definition "A work featured in some event". [12]

There are also many publicly available LOD datasets/projects published in RDF. For example, Geonames is a publicly available graph with hierarchical geographical information, such as regions, countries, GPS coordinates, and names in various languages. When two resources are referring to the same Geonames resource, we know that there is a connection. (Figure 4)

As one might notice, the second advantage of employing LOD is the possibility to offload certain data curation tasks to domain experts/communities, such as the example in Figure 4. Through linking the graph from Geonames, one's data point is extended the latter's upward branches.

Third, LOD comes with a powerful, SQL-like query language called SPARQL to interact with the RDF graph. For example, one may query "?wk" "schema:workFeatured" "http://artist-a.com/exhibition/group-ex-1", which essentially means which artwork(s) is/are shown in group exhibition 1. Like SQL, SPARQL can be used to formulate complex queries, aggregate results, order results, and alter values. With SPARQL, we can migrate some features of the Compendium to a graph-based backend.

Forth, SPARQL results can be formatted as JSON and JSON-LD which is natively supported by web applications. And fifth, LOD is an open standard with interoperable schemas, this means if we transform our data into LOD we can also publish it as data apprehensible by a third-party *human* and *machine*.

SPARQL Endpoint, Federated querying and the new Typology of Local/Global Graph

One of the core innovations of LOD technologies is federated querying. Any service/domain exposed to provide a SPARQL query interface to its stored RDF graph is a SPARQL endpoint. Federated querying allows SPARQL endpoints to extend a query to other remote SPARQL endpoints. For example, in Figure 4, both artists A and B curated their exhibition record data in their local graph. When they expose their data through their SPARQL endpoints, people may combine their data to retrieve complex information such as common exhibition location patterns of the two artists over a period. People may also connect the data to the Geonames endpoint to obtain information about those locations, such as latitude and longitude for spatial visualization.

Federated querying thus opens up a new typology of local/global graph. Local graphs refer to the individual SPARQL endpoints published by artists, collectives, institutions, and research communities. Global graph refers to the joint representation of media art history by connecting local graphs. (Figure 7) There are three characteristics of this new typology. First, data autonomy. Within each local graph, data curators are free to create their data model, choose attributes (predicates) relevant to their needs, and enter data useful to them. Second, data interoperability. When curating data in local graphs, it is preferable to choose attributes and resources from existing, trustworthy projects than create a new one, if possible, to maximize the connection to other graphs. Third, distributed representation and provenance. Maintained by different individuals/communities, Each local graph may have its specific attention. For example, institution endpoints are more interested in their

Figure 5. SPARQL endpoint of Rhizome ArtBase. The above example federated the graphs of Rhizome ArtBase and Wikidata. Here, the person's name and the alma mater are derived from ArtBase and Wikidata respectively [13]

Figure 6. LOD dataset/endpoints published by museums. [14]

collection and exhibition, while an artist/collective endpoint is committed to managing data of their creative record.
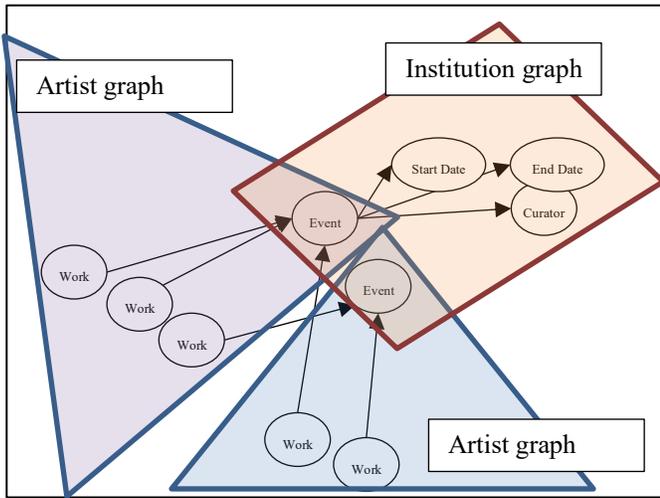
Figure 7. Concept of the Typology of Local/Global Graph. Assuming that the institute is publishing authoritative data of their exhibitions. The artist may offload the effort of documenting event data by connecting to/retrieving data from the institution graph. The global graph of media art history is the UNION of these graphs.

Our LOD Implementation

There are many open and proprietary implementations of LOD technologies. For a full stack implementation of LOD technologies, one has to select a triplestore (e.g. Apache Jena) engine for storing the RDF graph, a query engine (e.g. Fuseki) to implement SPARQL query, and an endpoint service (e.g. YASGUI) for structuring SPARQL result in human (tabular, visualization) and machine (RDF, XML, JSON) uses. Optionally, it is common to provide human-readable information in HTML for a URI. (HTML content negotiation) (e.g. LodView).

Wikibase: (almost) a Turnkey LOD Bundle

Implementing the above full stack requires experience in web server administration and backend development which needs many years to acquire. This paper proposes a ready-to-use alternative which requires a small amount of configuration. Developed by Wikimedia Deutschland, Wikibase is a full stack LOD bundle which is almost a turnkey LOD application. [15] It is also the data-storage backend for Wikidata. Relevant features and specifications of Wikibase are,

- Wikibase can represent data in an RDF graph on its Blazegraph backend.
- Wikibase includes a feature-rich SQARQL endpoint called Wikibase Query Service.
- Wikibase Query Service is accessible in mainstream programming languages such as Python, JavaScript, PHP, and Ruby.

- Wikibase format data URI in HTML to provide human-readable information.
- Wikibase provides a richer data model than RDF which is useful to provide context to archival records.
- Wikibase can be deployed as a self-contained docker service.
- Wikibase provides an intuitive WebGUI to enter statements.
- Wikibase edit can be done in batch on Openrefine.
- A vast general-purpose graph from Wikidata is ready to be used as an enrichment source.

Wikibase as LOD backend

The Wikibase LOD implementation is slightly different from the canonical LOD. However, it is fully compatible with the RDF triples and SPARQL queries. The notable differences are:

- Wikibase, an RDF triple is known as a "statement".
- In canonical LOD, URIs are normally human-recognizable. (e.g. http://example.com/person/bob) In Wikibase, URIs are represented by numeric identifiers. (e.g. http://www.wikidata.org/entity/Q325)
- Resources are called "entities" / "items" in Wikibase and are represented with Q-ids.
- Predicates are called "properties" in Wikibase and are represented with P-ids.
- Canonical LOD consists of an Ontology, which is the data model for describing data of a knowledge domain for achieving interoperability. Wikibase lacks this domain ontology.

Data Model Related Work

Today, there are 10,724 properties on Wikidata. It is impossible to achieve the effect of federated queries if each data owner "speak their own" language. Therefore, to harness the full potential of Wikibase's complete stack, researches are conducted to experiment and adapt domain ontology usage of Wikibase properties and entities. [16] In media art, Lozana Rossenova piloted using Wikibase as a data platform for collection management and archival description. The research led to the publication of the Wikibase-powered online archive of Internet Art (Rhizome ArtBase) and the publication of the ArtBase data model. [17]

Our Data Model

At the present stage, we planned to transform artworks, exhibition records and publications data from the Compendium as a pilot test. We experiment to see to what extent the ArtBase data model can be used in artists' self-documentations.

Artwork

An experiment was done on transforming the textual information of the artwork Legible City to LOD. [18]

Property label	Wikidata ID	Type	Target Item	Remarks
instance of	P31	Item	Artwork	
inception	P571	Point in time		
author	P170	Item	Person/ Collective/ Institution	ArtBase uses "artist" as the property label.
collaborator	P767	Item	Person/ Collective/ Institution	We extended the uses of collaborator with the qualifier: role.
*role	P3831	Item	Occupation/ Profession	
description	X	X	X	
imageURL	X	URL		ArtBase uses "images" (P18) to store the thumbnail image
videoURL	X	URL		ArtBase uses "video" (P10) to store related video
exhibition history	P608	Item	Exhibition	
*Jeffrey Shaw Compendium ID			external ID	Our legacy artwork id
*described at URL	P973	URL		Link to the text version of the artwork
subject of	P1343	Item		publication

Table 1. Artwork data model, Jeffrey Shaw Compendium Wikibase

The ArtBase artwork model is suitable for describing artworks. We can easily add/adjust properties for a better representation of our data without changing the schema from ArtBase. We extended the collaborator property from ArtBase using Wikibase's qualifier feature.

Figure 8. Describing collaborator role in Wikibase.

Exhibition

An experiment was done on transforming the exhibition records of Legible City to LOD. [19]

Property label	Wikidata ID	Type	Target Item	Remarks
instance of	P31	Item	Exhibition	
inception	P571	Point in time		Precision to Year
*start time	P580	Point in time		Precision to Datetime
*end time	P582	Point in time		Precision to Datetime
*location	P198	Item	Venue/ Museum/ Gallery	

Property label	Wikidata ID	Type	Target Item	Remarks
*located in the administrative territorial entity	P202	Item	City/ administrative territorial entity	
*coordinate location	P625	Geographic coordinates		Data enriched from Wikidata
*country	Q183	Item	Country/ Region	
*Jeffrey Shaw Compendium Event ID			external ID	Our legacy event id
Same as	P2888			Link to the same Wikidata entity

Table 2. Exhibition data model, Jeffrey Shaw Compendium Wikibase

Due to the nature of Internet Art, the ArtBase exhibition model is not very comprehensive. Thanks to the graph data structure, we can easily add the missing spatiotemporal properties to the data model. Considering that our research has closely documented the source of the exhibition records, Wikibase's statement reference model enables us to also publish these supporting materials.

Figure 9. Describing reference source for an exhibition record.

Publication

An experiment was done on transforming one of the publication records of Legible City to LOD.

Property label	Wikidata ID	Type	Target Item	Remarks
instance of	P31	Item	Publication	
publication date	P14	Point in time		
described at URL	P973	URL		Link to the publication on OCLC WorldCat
OCLC control number	P596	external ID		For data reconciling and enrichment
ISBN-10	P597	external ID		For data reconciling and enrichment
editor	P316	Item	Person/ Collective/ Institution	
publisher	P348	Item	Collective/ Institution	
Jeffrey Shaw Compendium Publication ID		external ID		

Table 3. Publication data model, Jeffrey Shaw Compendium Wikibase

The primary objective of the publication model is to support the generation of the "writing" pages of the Compendium website and the Artist's CV. With Wikibase, we can further associate a publication as a citation for an artwork or as a reference source for an exhibition record.

Wikibase: Values to Artist

Returning to the origin of the problem. How does self-documentation using Wikibase benefit the artist and the archiving communities?

An Extensible DB for Non-expert User

Wikibase comes with a friendly user interface for adding data manually. It is particularly suitable for artists in their early careers where they can start documenting their career entirely with the WebGUI without too much data wrangling.

Figure 10. Adding statement using Wikibase WebGUI

Figure 11. Wikibase natively support multilingual labels

Data Enrichment

One of the foremost use cases of LOD is the reconciliation and enrichment of one's data against large public datasets. For example, our exhibition data contain lots of city and country names and we wish to link these names to the vast geographic databases on Wikidata. Through reconciliation with Wikidata, we can retrieve additional data such as coordinate location useful for further visualization.
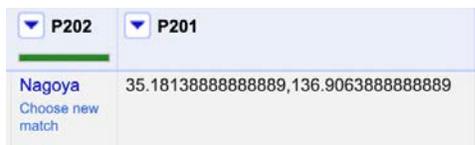
Figure 12. Enriching data using Openrefine. Cell on the left: our data reconciled with WikiData (entity Q11751). Cell on the right: coordinate data retrieved from WikiData based on Q11751.

Query Engine for Application/Artwork Uses

A SPARQL endpoint is a general-purpose query platform that can be used to retrieve data for application uses. There are libraries in mainstream programming languages such as Python, JavaScript, Ruby, and PHP, making it suitable to function as the backend for artists' websites and data sources for artists' retrospective installations.
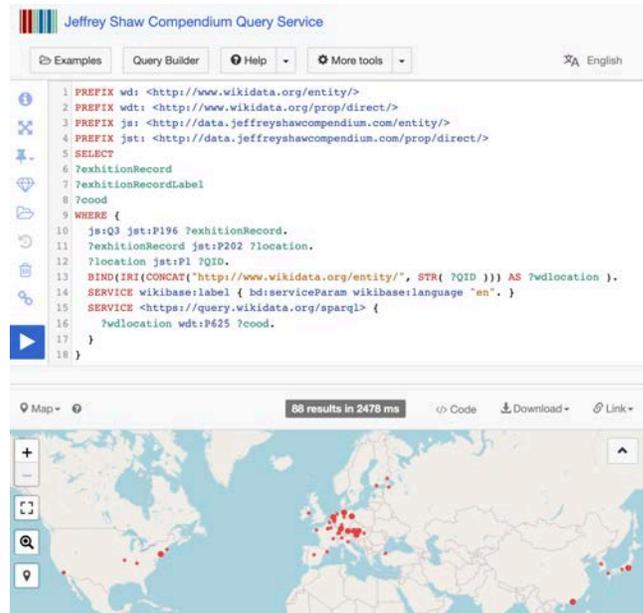
Figure 13. Federated query (Jeffrey Shaw Compendium + Wikidata) visualizing the exhibition location of Legible City. (mark size corresponds to the number of exhibitions)

Final Words

At the beginning of this paper, we envision a new paradigm of media art archiving in that the compilation of an artist's chronology is accomplished spontaneously by the artist's *self-documentation* in LOD. The experiment of this paper has identified Wikibase as a user-friendly and extensive database for *self-documentation*. This paper also described typical use cases and values *self-documentation* can bring to an artist. However, up to now, there is no artist's self-documentation endpoint listed on LOD-Cloud. [20] Therefore, we are yet to see how we will use federated querying to analyze the "Big Data" / global graph of media art history.

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Presenting "Piazza Virtuale" in five different ways.
On using common.garden and other media for access to archived media art works and academic research

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Abstract

"Piazza virtuale" by the art collective Van Gogh TV" was one of the most ambitious and probably the largest media art project in history. The group created for more then three month a daily television program at the 1992 documenta in Kassel from a container studio right next to the Fridericianum that was broadcast by a public cable television station, by various other TV stations in Europe and internationally via satellite. The goal was to include the audience in as many ways as possible into the program: "Piazza virtuale" therefore was interactive television and an early Social Medium. The viewers could call in and discuss during the show or trigger various application with their touch tone phones. This paper describes some of the findings that we came up with during a three year research project on "Piazza virtuale", but more importantly the different ways and media that we used to publicized the digitized and archived material from "Piazza virtuale" as well as our own research. Apart from a book and a website, there are also a video documentary, an exhibition and a permanent online exhibition with the new and innovative tool common.garden that was developed during the COVID epidemic by Dutch artist Constant Dullaart.

Keywords

Interactive Television, Van Gogh TV, Piazza Virtuale, Participation, Net Art, Online Archive, Online Presentation, common.garden, Documenta, Constant Dullaart

Introduction

Van Gogh TV was a collective of hackers and artists who, with their "Piazza virtuale" project at documenta 1992, created a precursor to the interaction and collaboration that characterises the internet today. The writer and a group of scholars have undertaken a three-year research project with the support of Deutsche Forschungsgemeinschaft (DFG), that preserved and analyzed this ground-breaking, but little known art project. In our final findings we have argued that the project invited the audience to interact with the show and its viewers. While at the time, the project was regarded as one example of the then-trendy concept of "interactive television", from today's point of view, it comes across as a forerunner of the social media of today, because its viewers could not only choose different programming options, but actually interact with other viewers, if they were lucky. [1]

The research results and archived material from "Piazza virtuale" were published in a number of different formats and media, including an academic, english-language book, a website, a documentary video, an exhibition in a Berlin art space and an online exhibition that was created with the tool common.garden. The latter presentation method was devised by the Dutch artist Constant Dullart during the COVID epidemic as a way to create online exhibitions that did not just try to mimic traditional exhibitions in physical space, but made use of the specific properties of the internet.

At the same time it allows for activities such as openings, inaugural address, guided tours, audio tours and informal meetings with artists and art lovers within the show that typically take place in physical museums and galleries. common.garden also allows for the presentation of all kind of multimedia content including images, PDFs, audio and video files, plus embedded websites and Social Media content such as Instagram posts or YouTube videos. As we had a lot of newly digitized and archived video material as a result of our research project common.garden proved to be an ideal tool to present this material.

In this contribution I will focus on these new and promising ways to allow a global audience access to media art works in easily curated and designed exhibitions and compare its specific qualities with the traditional methods of presenting academic research. These issues have been tackled in the previous ISEA Summits on new media art archiving, for instance in the contributions by Oliver Grau, Vladlena Gromova or Rodrigo Guzman Serrano to the First Summit [2] and by Byeongwon Ha, Flóra Barkóczi or Tabea Lurk & Jürgen Enge in the Second Summit. [3]

While at the current moment regular exhibitions in physical space are possible again, the option to present current or archived media art online for a worldwide audience with common.garden is of great relevance and an

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achievement of the COVID period that should not be easily discarded or dismissed.

Online exhibitions like ours on Van Gogh TV are an unique and attractive way to present archived media works that is a real alternative to traditional websites or more more traditional media. While arranging our archived material for presentation we learned that a linked and networked approach worked best for our needs, and so we made sure to create as many ties, physical as well as immaterial and conceptual, between the different forms presentations as possible. We ended up creating a rhizomatic structure where the different elements of the network shed light onto each other.

Figure 1. The container studio of Van Gogh TV next to the Fridericianum in Kassel, where documenta is held every five years. The design of the posters on the containers is by Van Gogh TV founder Mike Hentz. Note satellite dish for international television transmissions on the roof. © Ali Altschaffel.

What was Van Gogh TV and what was "Piazza virtuale"?

"Piazza virtuale" was a media experiment that took place at documenta IX in 1992. Van Gogh TV, a group of artists and hackers, wanted to transfer the concept of an Italian piazza – a place for casual meetings and conversations – into the mass medium of television. To do this, they used all the electronic media available at the time to involve the television audience, who could watch the program daily on the German public TV station 3Sat, in what was happening on the screen.

People could participate in the program via telephone, fax, mailbox and videophone, join discussions, participate in an online chat, make music and paint together or move an interactive camera in the studio in Kassel. Via videophone, programs from the so-called "Piazzettas" – micro

studios in many cities in Germany, in other European cities and even in Japan – were streamed to Kassel.

In this early "virtual community" (Howard Rheingold), many phenomena that are today seen as defining characteristics of net culture could be observed for the first time by a wider public in the German-speaking world. As a media art project shaped by audience' contributions, the project anticipated many of the characteristics of contemporary social media. For "Piazza virtuale," Van Gogh TV was awarded the Siemens Media Art Prize at the Center for Art and Media Technology (ZKM) in 1993 and an "Honorary Mention" at the Prix Ars Electronica. [4]

Figure 2. Screenshot of one of the innovative interactive show segments.. The television viewers could direct Avatar-like characters with their touch-tone telephone. ©Van Gogh TV.

Van Gogh TV, the organizers of "Piazza virtuale," had at that time already a number of previous media art, radio and television projects under their belt. Its members came from an art scene in which artistic work in collectives was as common and important as presenting these activities under names reminiscent of brand or company names. Van Gogh TV was founded in an art-historical situation when collective artistic practices were becoming increasingly prominent. In the 1980ies and early 1990s art collectives such as Irwin, the Guerilla Girls, General Idea or Survival Research Laboratories devised a new art practice that wanted to overcome the cliche of the lonely individualist artist-genius and instead focused on collective art production. These groups differed from historical artist groups such as the Surrealists or Fluxus in that they not only shared a common mindset or aesthetic, but that they actually worked exclusively together and created their works collectively.

Van Gogh TV was founded in 1986 by artists Mike

Hentz, Karel Dudesek, Benjamin Heidersberger and Salvatore Vanasco. Hentz and Dudesek had previously belonged to the artist group Minus Delta t, founded in 1978, which carried out actions, performances and concerts against the backdrop of the German punk and new wave scene. Minus Delta t also carried out a series of projects that, in addition to their performances and concerts, already worked with media such as video, radio, computers and computer networks, slow scan video, and television. [5]

These included "The Project" at ars electronica in 1986 and their participation in documenta 8 in 1987, where, in addition to their appearance as "cultural police" and performances at the York discotheque in Kassel, the group parked a "media bus" with a video editing station and other production media on Friedrichsplatz in the heart of Kassel, from which they operated a pirate radio station during the exhibition. [6]

Hence, "Piazza virtuale" is part of a perplexing multitude of other works and (media) art groups that preceded the project or developed out of it. "Piazza virtuale" was a culmination of practises, approaches and technologies that developed during these earlier activities. In retrospect, these are distinguished by such a single-mindedness and strength of purpose, that they can be considered a body of work in its own right, despite its departure from the traditional notion of an artistic oeuvre. After "Piazza virtuale" and the break-up of Van Gogh TV, the founders of the groups went on to form new collectives, some of them art-oriented, but most of them, astonishingly, business enterprises.

The sheer number of projects, groups and activities by the group have made it very difficult to present the work of Van Gogh TV and "Piazza virtuale". There are next to no finalized artworks in the traditional sense. Instead we were left with a multitude of documents of their activities in various formats: first of all over 600 hours of recordings of their television shows on analog video tapes, more than thirty paper files and folders with correspondences in respect to the "Piazza virtuale", posters, fliers, stickers, postcards, press booklets, faxes, sketches, audio-recordings of interviews and radio shows, even some old hard disks, blue prints of hardware that the group built, and print-outs of computer code that was written in order to realize the concept of the show to let the audience interact with the television show.

Whereas our website allowed us to make a lot of these digitized and archived documents available to the audience in a way a book never could, it was with common.garden that we had an adequate way to present and contextualized these documents.

Working with the estate of Van Gogh TV

Van Gogh TV´s "Piazza Virtuale" inhabits its own unique space in the prehistory of net culture, virtual communities and internet art. But unlike later projects of net.art that have been archived or made accessible again in the last couple of years by initiatives such as Rhizome.org, the legacy of Van Gogh TV is mostly not digital, a factor that turned out to be a blessing in disguise. Whereas we first complained about the large volume of material that we had to digitize in order to process it with contemporary methodologies and technologies, we gradually began to understand that we could only access such a rich trove of material *because* it was mostly analogue. Whatever was digital in the Van Gogh TV estate – such as the archived emails on an Apple hard disk – had become inaccessible in the more than two decades since "Piazza virtuale."

The VHS and Betamax tapes that were delivered to us in
stacks of moving boxes might not have been as easily handled as a collection of digital files on a hard disk or in the "cloud" on some server. The recordings on obscure, long-obsolete video formats such as MII, Hi8, U-matic or S-VHS required players that are not manufactured anymore and are only available at specialized labs. The three dozen files with photos and paper correspondences with collaborators were not conveniently searchable for keywords or could easily be filed and analyzed with contemporary computer programs. And the many faxes on thermal paper that were found in these files were often faded and hard to read.
However, as cumbersome as the work with this material seemed at first, we eventually understood that the analogue material that we had received survived for a period of time that most digital formats did not.

In order to be able to access all the video and paper material on computers, we first had to digitize the corpus that was given to us. A laboratory in Berlin transferred all of the 569 tapes that we had received from Van Gogh TV into MPEG format with a data rate of 8000 kBits/s, a frame rate of 25 pictures per second and a resolution of 720 x 576. While today much higher quality standards are possible, that is akin to the resolution of the Full D1 PAL standard that was in use when "Piazza Virtuale" was broadcast. We ended up with a collection of files 2.65 Terabyte in size. Since this file size was unmanageable, the video files were converted into MP4s with a data rate of 2000 kBits/s and an average size between 2 or 3 Gigabyte per video file. Hence, all the data from the project – the result of over a year of cncentrated and hard work of two dozen people, preserved on various data storage media that were delivered to us in more than two dozen moving boxes

– has the size of 873 GB now and fit onto a contemporary hard drive the size of a cigarette pack.

The paper documents were scanned – most of them manually, some with the help of an automated paper feed – and stored in TIFF format, that was later converted into PDF files with Optical Character Recognition (OCR). As part of our agreement with the artists, all four members of the groups received hard disks with all the digitized material for their personal archives and future projects. We also stored the material on several hard drives, some of which are kept outside of our offices for safekeeping.

All of the material has also been uploaded for archival purposes on various servers. All the videos were uploaded to the Panopto online video platform that my school uses for video hosting. We decided to use Panopto rather than commercial services such as YouTube or Vimeo – even though a lot of the edited video clips have also been published on our YouTube channel for a broader audience – for a number of reasons: First of all, YouTube automatically codes videos into a lower resolution and also limits the number of videos that users can host for free. We also felt more comfortable using a server that was in the possession of the university rather than an internet company from the US. Concerns about copyright and privacy were other reasons to use Panopto.

The paper scans and other shared documents such as notes, essays or spreadsheets are hosted on Seafile, an open-source, cross-platform file-hosting software system that my university have access to. This platform also turned out to be convenient for sharing edited videos and other files between researchers that do not always work in the same physical space together.

While OCR allows searches in paper documents, the access to specific, topical segments in the videos was much more difficult. After looking at different annotation software, we eventually settled for Motion Bank, a video annotation system that is currently in development at Hochschule Mainz. The system was originally designed to annotate dance performances. Using the Piecemaker web application that is part of the software, users of the application can record and annotate web videos in real time. After annotation the software allows for searches for keywords in an index that will provide direct links to video segments that have been annotated with these keywords. The most recent version of Piecemaker has been adapted to the data structure of the Web Annotation Model of the World Wide Web Consortium (W3C) and the annotations will be stored in an XML file that other video annotation software – such as ELAN, for instance – can read.

"Piazza virtuale" as a television event

But what exactly was it that Van Gogh TV did at docu-menta? Their activities were twofold: On the one hand the group maintained a presence at the exhibition despite the fact that they had not been invited as artists, but were just part of the support program. But the main focus of their activities was of course the daily television show on 3Sat that was at times watched by a considerable audience on the then-new public cable channel, often up to 30.000 viewers.

Lets first look at what the group did in the physical installation in Kassel. The group had set up their own television studio right next to the Fridericianum in Kassel, where documenta is held every five years. It consisted out of 15 industrial containers that were set up as a two-story structure with two wings. Due to their support by various commercial and public sponsors the group was able to work with a staff of around two dozen people, that included technicians, hackers, editors, PR representatives, and even a cook.

While the number of staff members was huge for an art project, it was very small considering that the group had to produce a daily television show for three months. Most of the staff members had never worked on a professional television production before and now had to create daily shows for more than three months, using self-developed technical equipment that had never before been used in live broadcasting and interactive formats that had not been tested with an actual television audience. The pressure that this situation created is obvious in the statements of those involved, but so is the pride in what they achieved together: a very innovative television show that invited the audience at home to participate in the show. [7]

Figure 3. Television viewers could play instruments on TV screen in interaction with others at "Piazza virtuale". © Ali Altschaffel.

What the audience saw on television was an eclectic mix of highly innovational shows that tried to involve the

audience in various ways. For this, Van Gogh TV made use of the then-brandnew touch-tone dial technology to create a back channel to their shows. Viewers could use their touch-tone phone to control a number of different programs that the group had devised for broadcast and an audience in Germany, Austria and parts of Switzerland was able to observe these interactions live on television.

In two music shows, "Interactive Classic Orchestra" and "Rap'em Higher", the participants could trigger samples with their telephone keys and make music together; in "Atelier" (Studio) people could paint together by operating a simple drawing program. In the segment "Sarah and Daniel" the viewers could steer Avatar-like representations of themselves on the television screen and record their own private confessions in "Beichtstuhl" (Confessional).

The other way to interact on the show was in call-in-shows like "Coffeehouse", where up to four callers could chitchat on air. This program came closest to the concept of a "self-generating show" that Piazza virtuale was based on, since viewers could get involved by calling in, faxing in or conversing on a computer chat without any interference from the artists. The idea was to create an informal situation for conversations, just like in a Viennese coffee house.
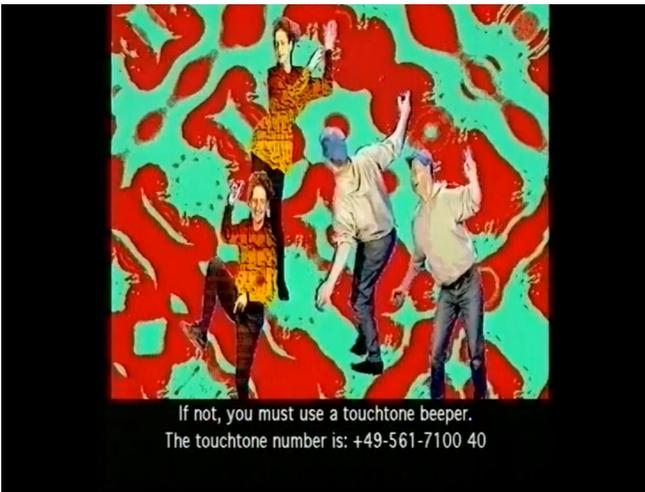
Figure 4. Screenshot of interactive music show "Disco Fever" where television viewers could make user with other members of the audience via touch-tone telephone. © Van Gogh TV.

It was this show that earned Pizza virtuale the derisive nickname "Hello TV". Many callers only said "Hello". Some of them were so frightened or surprised that they were on TV that they hung up right away. Those who stayed on the line had five minutes to find a topic of conversation with other callers before their connection was terminated in favor of new callers. A 3Sat employee

made sure that no insults, political extremism, advertising, or pornography made it into the program, a practice known as "content moderation" on contemporary social media today, but still simply called "censorship" on "Piazza Virtuale".

Other formats invited the callers to talk to scientists o remote research vessels or ocean platforms, or to comment on or participate in musical live performances in the studio. A group of regular callers even came to Kassel to meet the makers of Van Gogh TV and each other in person – an example of a "virtual community" that developed as a result of the broadcast.

On common.garden

Dutch artists Constant Dullaart has created common.garden, the platform that we used to create a virtual online-version of our exhibition on "Piazza virtuale" in 2020 with the support of the American art institution Lightbeam in New York, where he was a "rapid response fellow" during the first lock-down: "Dullaart will explore new modes of social media and connection in a time of social distancing and isolation," reads the project description on the website of Lightbeam. "The artist will reconfigure and rebuild social media formats to set up a series of venues for casual social interaction– bars, community spaces, institutions, meeting rooms, and more. These encounters would be able to occur in conditions reminiscent of ´real life´, without the need to make an appointment or create accounts that reveal one's identity and personal information to a large tech company." [8] Hence, one critic has called the finalized project "the only art exhibition platform fully exited from surveillance capitalism" [9]

In its currrent form, common.garden is an ad-free, web-based space where registered users can build their own social environments and interact with others. The site has been used by international museums and galleries such as Savvy Contemporary, Berlin, Upstream Gallery, Amsterdam, HWMK, Dortmund, Office Impart, Berlin, or Friesmuseum, Leeuwarden. The site has also found its uses after the COVID epidemic ended: the project distant.gallery has enabled international curators to create online exhibition from locations such as Dehli, Kinshasa, Jakarta or Tel Aviv or with Russian artists in exile all over the globe. Staatliche Kunstsammlungen Dresden and the Mystetskyj Arsenal Museum in Kyiv used common.garden for a collaboration and to make their exhibitions accessible beyond their rooms, when no other cooperation was possible because of the Russian war against the Ukraine.

Writer Laura Wurth opines in "Frankfurter Allgemeine Zeitung Quarterly": "Using the Common Garden is a dizzying experience that fits perfectly with Dullaart's vision of the internet as a blank medium that can be dis-

rupted for the greater good, rather than existing as a place for exploitation and crass commercialization." [10]

Different types of documentation

As I have mentioned in the introduction, the results of our research have been published in different forms: a book, a website, a documentary video, an exhibition at Künstlerhaus Bethanien in Berlin and the aforementioned virtual exhibition on open.garden. In order to maximize the impact of these different publications and to create connections between the different material that we had archived and researched, we were looking for a way to interlink the content of these respective media. We ended up using QR codes that due to COVID had come in wide use only at that time in Germany, despite the fact that the technology has existed since 1994.

Figure 5. This QR code contains a link to the PDF version of the book on "Piazza virtuale" at https://www.transcript-verlag.de/media/pdf/e0/fc/36/oa9783839460665Gcc2tWTcGf9ig.pdf .

Book The English-language book is the most comprehensive source of meta information on the project. It contains a historical overview of Van Gogh TV and the art groups and projects that preceded it, a chronology of the work on this particular project, a discussion of the media and art historic background of the project, an account of the activities of the group in Kassel and on television, and detailed descriptions of the various segments of the show, the "Piazzettas" (micro studios all over Europe that provided programming) and the technologies and devices that the group developed.

It has around 100 photos, screenshots, sketches and other illustrations, some of them in color, but obviously we were not able to include all the pictures that we had and only screenshots of videos. The book can be downloaded under Creative Commons License BY-NC-SA for free from the website of the publisher. Every chapter has a QR

code that provides a link to the website that has all the pictures, sketches, videos and other material that we were not able to put into the book.

These QR codes turned out to provide the crucial links and connections between the different forms of documentation, not just in the book, but also in the exhibition that was held at Künstlerhaus Bethanien. In sum, they created a inter-connected web of references and correlations that greatly improved the understanding of the project. It also allowed to create connections to media formats that we could not be presented in certain kinds of presentations, such as videos that obviously cannot be shown in a book. Lastly, it allowed us to overcome certain limitations of size, and for instance put the many pictures, sketches or memos that we had found on the website with its possibility of limitless storage rather than in the book.
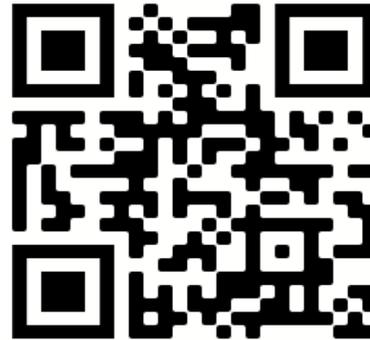
Figure 6. This QR code contains a link to project website at https://vangoghtv.hs-mainz.de .

Website The website is the central presentation of our research. It is the most easily accessible part of the documentation of our archived material as it is available online. As of this writing, our page is the first Google result when searching for either "Van Gogh TV" or "Piazza virtuale". The texts that have been written particularly for the site are short and concise to address the reading habits online. While the information in the book is more comprehensive and in-depth, the website has a lot of material that we could not put into a book that has certain limitations as far as size is concerned. We also were able to include videos and other multi-media material into the site.

The artists did not want us to publish the complete digitized recordings of the over 100 shows on the page. Technically this would have been possible, but raised the question what the benefit and the affordance of such a large collection of video would be for the audience. (All the shows are stored on our video server, and we can provide scholars access if they are interested in particular shows.) Instead we chose a "curated" approach, where we put rep-

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resentative shows and clips on the site. We also uploaded a selection of video interviews, that were conducted during documenta and had never been published, television reports about the show, and clips from previous projects and performances. The show had various different segments and contributions from the different "Piazettas" all over Europe and Japan, and each of these offerings now has its own comprehensive page on our website, that can be directly addressed with links of QR codes, a method that opened both the book and the exhibition to the web.

Figure 7. This QR code contains a link to the virtual exhibition at https://piazza-virtuale.common.garden/ .

Virtual and physical exhibition The great benefit of traditional exhibition is the direct contact with auratic originals. Whereas books or websites provide only reproductions of art works and other material, the exhibition delivers the "real thing". In our case, however, the problem was that there were next to none auratic originals to show. The largest part of the material were the digitized records of the show, and therefore we had to come up with original ideas to create an exhibition that was actually worth visiting in person.

One can just show a limited number of videos in a show, and most of the paper material that we had was rather dull-looking correspondences via letters or faxes with contributors and companies that were of great interest for our research into the development of the program, but had little visual fascination. There were, however, a small number of concept sketches, posters, postcards and other promotional material that had a certain graphic attraction that were presented in vitrines in the final exhibition.

We were also able to track down some of the old equipment that the group had built by themselves, including a DIY television transmitter, computer modules and prototypes for a video encoder that served as material remnants of the activities of Van Gogh TV. Photo documentation of "Piazza virtuale" were presented as an analog slide show and as large prints. A favorite of the audience were the two historic Panasonic videophones that allowed to send

still images from one device to the other and even to print them out. An early version of the documentary on "Piazza virtuale" was shown in a small viewing room.

Figure 8. View of the exhibition at Künstlerhaus Bethanien in Berlin with Mike Hentz´ mural on the right-hand side © Galya Feierman

However, all of this material would not have made for a good show, so we had to actually create new material for the presentation of the historic material. Most impressive was the mural that Van Gogh TV member Mike Hentz created specifically for the show. In the last room of the exhibition was a selection of artworks by other artists that contextualized the work of Van Gogh TV, including pieces by Fred Forrest, Mieko Shiomi, Nam June Paik, Miranda July and others.

One of the attractions of the original "Piazza virtuale" was the "Robot Camera" that television viewers were able to control with their touch tone telephones and that moved through the studio containers in Kassel on rails. We were able to obtain the original camera from the Hamburg artist Niclas Baginsky who had built it in 1992 and originally wanted to reactivate it for the show.

Both the video stream of the camera as well as the video recordings made by the videophones in the exhibition, were supposed to be included in the virtual version of the exhibition. However, this turned out to be technically impossible. So Benjamin Heidersberger, one of the founders of the Van Gogh TV, devised a low-tech alternative to these options: He mounted a small digital surveillance camera on a robot vacuum cleaner that drove automatically through the exhibition when it was closed. A live stream of images was broadcast on the internet, where viewers could also use a web interface that pointed the camera in different directions.

All of the different types of shows as well as all the Piazettas were represented in the exhibition by large screenshots, that were presented in two different rooms. On the front end of these rooms a selection of clips from these different programs were projected with a video beamer. Every screenshot had its own QR code that one could scan with a smartphone and get a direct link to the respective web page that had more information, commenary, multimedia material on the format or Piazetta in question. As the server statistics showed, the audience made regular use of this possibility, and hence the whole show served as a gateway into the website.

Figure 9. Salvatore Vanasco, one of the four founders of Van Gogh TV, in front of a screenshot in the exhibition that is linked with a QR code to the corresponding page with more information, video clips, interviews and more on the project website. © Galya Feierman

When the show was planned, we could never be certain if it might not be impeded by COVID restrictions. For a time, we even had to fear that *all* exhibitions in Berlin would not be able to open right at the time, when the show was planned. Fortunately the funding that we had received for the show had exactly the purpose to support experimental shows that combined physical and virtual elements to address this specific situation.

Therefore using common.garden as a key element in the presentation of the works was part of the exhibition concept from the very beginning. In the end, designer Tereza Havlíková recreated the floor plan of the exhibition as foundation for the virtual version of the show and placed the different exhibits at precisely the location they were in the physical show. That allowed for guided tours, performances and a online opening that around 80 people attended. We found this two-dimensional version of the show preferable to the 3D exhibitions that other art institu-

tions presented during the COVID epidemic with Mozilla Hubs, Art.Spaces or Exhibbit, because these online exhibits were often difficult to maneuver and provided only a dull representation of bland "White Cube"-type art spaces.

common.garden on the other hand allowed for easy integration of all types of media both from our website, but also from other sources, including an Instagram post by Miranda July and a YouTube video that automatically restarts every time you access the exhibition. A slide show function allowed for a replication of the actual analogue slide show that took place in the physical exhibition. Also included in the show were the 100 broadcasting schedules that were written during the show. By clicking on the representation of these schedules in open.garden one could download a complete PDF files with all of these documents. However, we were not able to integrate the video stream from our DIY robot camera on the vacuum cleaner into common.garden because the proprietary software of the surveillance camera did not allow embedding.

Figure 10. This QR code contains a link to the documentary video at https://video.hs-mainz.de/Panopto/Pages/Viewer.aspx?id=4c0ad45d-1725-4f8c-ace4-adf300e2fc63# .

Documentary video Due to our digitization of the 600 hours of live recordings of "Piazza virtuale" and other works of Van Gogh TV, we had a rich trove of material for the audiovisual documentation of the project. With this in mind, we had video-taped all of the 31 interviews that we conducted with the artists and other participants in the project, first with a video camera on the location of the interview, later – when COVID made traveling impossible – with the recording function of the video-conferencing software that we used. With this footage, we edited a 40-minute video that provides the easiest access to the complicated structure and many details of "Piazza virtuale".

This video has turned out to be the best way to inform newcomers to the project with a brief, focused introduction into "Piazza virtuale". The commentary of the interviewees render the archival material more transparent and

"readable", and the description of the difficult and exhausting production of the project even added an element of human drama to the whole affair. We are currently in touch with a German television station that is interested in acquiring a revised version of the film for broadcast.

Conclusion

"Piazza virtuale" was a ground-breaking, multi-faceted and huge art project, and so was our project to understand, archive and research the project – as well as our efforts to publicized our findings and the material that we had archived. In stepping beyond the traditional academic publication methods – books, essays, articles and maybe a website – we were able to address a larger audience beyond both the academic and the art world. By connecting this material in the various media via links and QR codes we were able to create a much richer, interwoven presentation of our material than the publication in any single medium could have achieved.

By using common.garden we partly replicated and modernized the new approaches that Van Gogh TV took in the early 1990s. While not in any way wanting to diminish or to relativize the accomplishments of the collective, we tried in our own way to find ways to connect physical and virtual space and to take art out of the institutions that traditionally show it and often limit or restrict access to the work on display. Our research has been made accessible in the most comprehensive way that we could think of: by putting the book on the net in a "Open Culture" fashion with a Creative Commons, by putting a lot of material that did not fit into the book on the website, and by allowing everybody who was not able to come to Berlin in December 2021 to visit the exhibition online in common.garden, and even offering them the chance to participate in tours, performances, discussions and the opening which is traditional only available to visitors in the actual exhibition.

In this way we did not only reflect the latest state of the art of easily accessible online technologies that we could get our hands on. To our own surprise the final result was not only a comprehensive and original presentation of our research and of the archived material, but also a reflection of the circumstances under which the project took place: a global epidemic and health crisis that forced all of us to get used to new disembodied virtual online exchanges and interactions that also shaped the different forms of presentation that I have described in this essay.

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Acknowledgements

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Tilman Baumgärtel is a writer from Germany. He has published books on Internet art, computer games, media culture and Independent cinema in Southeast Asia. From 2005 to 2009 he taught at the University of the Philippines in Manila and from 2009 to 2012 at the Royal University of Phnom Penh in Cambodia. Currently he is professor for media theory at Hochschule Mainz. From 2018 to 2021 he led a research project on the art group Van Gogh TV and their documenta project Piazza Virtuale that was sponsored by Deutsche Forschungsgemeinschaft (DFG). He is currently doing research on the American artist Douglas Davis. *Works* (selection)*:* net.art, Nueremberg 1999; net.art 2.0, Nuermberg 2001; games. Computer games by artists, Frankfurt / Main, 2004; Van Gogh TV´s "Piazza virtuale". The Invention of Social Media at documenta IX in 1992, Bielefeld 2021; Now and Forever: Towards a Theory and History of the Loop, London 2023

When interactive artworks act as archives:
Migrating and documenting *Immemory* by Chris Marker

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Abstract

Researching Chris Marker's digital artwork *Immemory* and working on its preservation for the future reveals the relevance of considering certain media artworks as archives in themselves. Created in 1997 for CD-ROM, *Immemory* has undergone several transformations on form and content, and was brought to the web for an online version between 2007 and 2013, re-coded in Flash format. After Flash became obsolete in 2020, the need for a reflection on how to sustain the work for the future and how to inform future viewers on its various versions led to a conservation study and reflection on the ways to document it. With Chris Marker's use of re-incorporation of personal documents, references, and quotes from earlier artworks, the topic of historicization is at the core of the artwork and thus requires to play an important part in its study, when archiving it and presenting it to the public. It can serve as an interesting example of how self-contained digital artworks such as CD-ROM-based works from the 1990s can be experienced today depending on what documentation and information is accessible for the viewer.

Keywords

CD-ROM artworks, archives, new media art preservation, documentation, historicization.

Introduction

CD-ROM-based artworks from the 1990s often make use of exploration mechanics strongly evocative of those of an archive, due to the type of interaction that induced the CD-ROM medium – browsing through a complex and sometimes cryptic network of images, texts, videos and sounds [1]; similarly to the type of explorable content that was emerging at the same time on the early web.

Interacting with the CD-ROM *Immemory*, created in 1997 by Chris Marker (1921-2012), strikingly illustrates this feeling of exploring an archive, a personal and intimate one, as the whole artwork presents itself as a reflection on memory and its labyrinthine structure.

Since its first publication in 1998, *Immemory* has undergone several transformations on form and content, and ultimately was brought to the web for an online version, which is currently subject to a conservation study and migration at the New Media Department of Centre Pompidou.

Based on the research produced for the preservation of the work, we will try to build upon two focuses previously discussed in the first and second Summits for New Media Art Archiving. Through the case of *Immemory*, we will see how an artwork or the practice of an artist can raise the question of its status as an archive in itself, following Amy Alexander's idea of « broadening our thinking about what constitutes an archive », and illustrate the importance of historicization that she stressed. We will also address what is at stake when documenting such an interactive artwork, in the perspective of « including conceptual, technological, and phenomenological approaches. » discussed by Byeongwon Ha at ISEA2020.

How can the museum deal with historicization of interactive artworks? Can the exhibition and documentation of these artworks stay truthful both to the experience they intended to provide and to their historical evolution when they have gone through many transformations?

Figure 1. *Immemory*'s main menu, leading to each of its sections. Image capture extracted from the original program.

Immemory's history and transformations

Chris Marker's artworks often build on his own network of archive material and memories shown or told in previous works. Through this pattern, he constructs with each new piece an interconnected array of references between his photographic, cinematographic or video works and writings. His works in the field of video installation and interactive media are probably the most representative of this tendency, in particular *Zapping Zone*, *Immemory* and *Ouvroir*. A clear continuity can be observed between these works, in addition to being each a form of explorable archive of Marker's own previous works, in a Russian doll manner. Studying and understanding one of these works involves necessarily researching into the other ones as well, as many elements find not only their roots in each previous one, but sometimes directly consist of updated versions of previous content – reused images, texts or entire segments of program. When exploring *Ouvroir*, an online 3D installation started in 2008 in the form of an island on the early « metaverse » Second Life, the call-backs to both *Immemory* – which was originally entirely embedded in it as a browsable floating window on the shore of the island – and *Zapping Zone*, with various images, animations and space compositions directly borrowed from them, are impossible to miss.

Although *Immemory* was created as a self-contained network of images, videos and texts on CD-ROM, it shares a vast amount of content with *Zapping Zone*, a large installation from 1990 consisting in a big structure hosting 13 video monitors and 6 Apple IIGS computers surrounded by photographs. Both artworks were produced by the Centre Pompidou, and expanded a branch of Marker's work outside from film that had started in 1978 with his first video installation *Quand le siècle a pris formes (Guerre et revolution)*. In fact, *Immemory* also exists as an installation in the museum's collection - including a specific mouse pad printed with help for navigation, a sign with Marker's iconic cat avatar and a set up with wall collages made from torn up pieces of two of his film's posters mixed together. It appears in Marker's working history as a direct continuation of *Zapping Zone*'s creation process, with its production most likely starting just after Marker stopped adding new elements to *Zapping Zone*, between 1993 and 1994[1].

Figure 2. Screen capture of the Second Life installation *Ouvroir*.

Marker prolonged with *Immemory* his approach of installation in a computer-based self-contained form, building within it a similar dialogue between all types of media, from photographs to electronic images. The physical movement of the viewer walking around the video monitors and computers as seen in 1990 in *Zapping Zone* was transposed to a virtual navigation through point-and-click interaction inside the CD-ROM structure, following the same idea of an invitation into Marker's imaginary museum. In his own words, "*the reader-visitor can imperceptibly come to replace my images with his, my memories with his, and that my Immemory should serve as a springboard for his own pilgrimage in Time Regained.*"[3]

In particular, *Immemory* draws heavily from some of the computer-based interactive parts originally presented in *Zapping Zone* on Apple IIGS computers, created using an earlier version of the same editing software, HyperStudio. One of these Apple IIGS programs – titled after the software's name, « Zone Hyperstudio » as a tribute to the software's designer Roger Wagner, who became friends with Marker[2] – can even be seen partly as a prototype of *Immemory*, with a similar structure and entire parts later reused in the CD-ROM with upgraded graphics in 1997.

Immemory has a complex history of evolution and changes, in the same way that *Zapping Zone* had before it. Similarly to how Marker kept on changing and adding elements to his 1990 installation until 1994, he produced several versions of *Immemory* between 1997 and 2009 with additions and changes. None of these changes are structural, but many images from large sections of the work such as The Museum and The Xplugs'

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[1] In his essay on *Immemory* "The Book, Back an Forth", Raymond Bellour states that although it is difficult to define clearly a starting date to the production of the work, a plan was already made by Marker around 1993 [2]. Since the last computer animations and images added to *Zapping Zone* are from 1994 and were still created for the Apple IIGS, a computer that Marker left aside to begin working with the Power Macintosh during that period for the production of his film *Level Five*, it is likely that year that the first sections destined for the CD-ROM were created.

[2] Marker and Wagner maintained a correspondence from 1990 to the late years of Marker's life, with many discussions about HyperStudio's functionalities in the early 1990s. Roger Wagner testified that Marker played a role in the orientation of some features and the global development of the software at the time.

photomontages were either changed or added after 1997; mostly for the second English version (*Immemory* was published twice in a translated version, in 2003 and 2008).

The biggest change is certainly its migration on the web as an online browsable work that was produced between 2007 and 2013, officially releasing one year after Marker passed away in 2012. Produced as a part of Marker's website project with Centre Pompidou *Gorgomancy* (itself an archive of various works by Marker – including, among others, *The Owl's Legacy*, the Poptronics montages and *Immemory*), the original program for CD-ROM created on HyperStudio was entirely re-coded in Flash during this period, with the goal of preserving its original look and feel, but with important technical changes nonetheless: all the tree structure was rebuilt from scratch, many of the animations re-created to fit the Flash format, and mostly, all the images were upscaled to a more fitting image definition for newer monitors, of 900x675 pixels (instead of the original 640x480 pixels) and converted into Jpegs[3]. This change, partly due to technical contingencies from the mid-2000s, resulted in visual artifacts that are noticeable when comparing the two versions of the images (typically blur, loss in color saturation and sharpness), generated both by the upscale interpolation to enlarge the original images and by the Jpeg compression to make them lighter for an online use.

Figure 3. Screen capture from the home page of the website *Gorgomancy* as released in 2013

After 2020, as Flash became officially obsolete with the infamous discontinuation of its support by its owner company Adobe, the necessity of producing a new sustainable online version led to a conservation and migration plan at the Centre Pompidou on the initiative of Marcella Lista, chief curator at the New Media

Department, undertaken in 2021 and 2022 by a team composed of a software developer, Cyrille Parachini, a curator, Philippe Bettinelli, and a conservator, Alexandre Michaan. With the goal to make available publicly again the full work online, a re-coding in HTML5 is being conducted, and together with it, a study on *Immemory*'s history and evolution in order to document and reflect it faithfully.

Historicizing digital artworks: how a work can become intentionally and unintentionally an archive

In her 2022 article « "Always Only Once:" The paradox of preserving performative digital works », Amy Alexander emphasized a point that appears extremely relevant in the context of *Immemory*'s study and conservation: the necessity to broaden our understanding of what constitutes an archive when approaching and preserving digital works[4]. We will try to highlight here how, in some cases, the artwork itself as well as its evolution history can be studied as an archive, and particularly, documented as such. In the case of Chris Marker's work, in which writing and literature in general play an important part, this notion can be linked to those of autobiography and auto-fiction as witnessed in the work of Marcel Proust [5], and of Malraux's imaginary museum, often referenced in Marker's body of work[5].

Several aspects that demonstrate the relevance of broadening the very notion of archive when researching and preserving Chris Marker's installations and computer-based works are notorious, all of them being one way or another about historicization. First of all, from the perspective of technology history, any artwork involving technical equipment becomes over time an historical sample of its production technology: as Cécile Dazord stated in 2016 [6], contemporary art museums often become conservatories of technologies unwittingly.

Similarly to how *Zapping Zone* was a testimony of the CRT monitors era, and of the late 1980s micro computer history with its Apple IIGS, *Immemory* carries – even regardless of any matter of intentionality – a piece of history of both mid-to-late 1990s computer technology (for its CD-ROM version) and mid 2000s online animation software (for its Flash version).

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[3] They were originally stored in the HyperStudio data folders called "stacks" as uncompressed images, extractable as PNG files.

[4] *« Broadening our thinking about what constitutes an archive, as well as ambiguity between practice and archive, can allow us to broaden our recording and understanding of the histories with which we engage. Always look for opportunities for time travel. »* [4]

[5] Malraux's influence on Marker is already visible in 1953 with his film directed together with Alain Resnais *Les Statues meurent aussi*, released the same year as Malraux's *The Imaginary Museum*. The theme of building a personal imaginary museum can be observed until his late work, particularly in the 2009 video work *Pictures at an Exhibition*.

Even though its release on CD-ROM took place near the end of the decade, in 1998, with the first French edition published by the Centre Pompidou[6], the work reflects most of the typical aspects of interactive CD-ROMs produced earlier in the 1990s. Its image definition fits the early VGA standard 640x480 pixels broadly used in the first half of the 1990s[7], its color palette is 256 colors, and mostly, its structure made to navigate through images, videos, sounds and texts is reminiscent of many types of CD-ROMs produced in this decade, from artists' ones (such as Laurie Anderson's *Puppet Motel* from 1995) to commercial ones such as museums virtual visits (*Le Louvre, visite virtuelle* by Dominique Brisson from 1999 for instance). It includes a navigation guide with documentation on different types of cursors and icons, in a similar manner to 1990s point-and-click video games. The visual characteristics of its images reflects common technical tricks used to give the illusion of smoother color gradients in the era of limited color palettes, with heavy use of dithering, a pixel scattering technique recognizable in many of the computer images of that era.
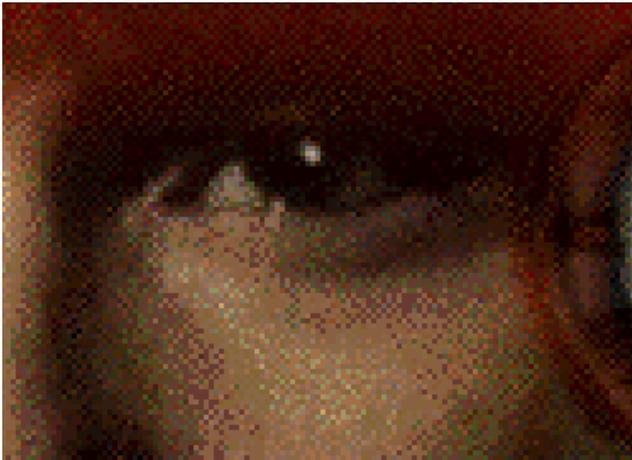
Figure 4. Example of dithering enlarged detail of the main menu central image from *Immemory*.

Additionally, studying *Immemory* in its technical aspects reveals a lot of valuable information on Marker's relationship with technology. Although it was invisible to most users of the CD-ROM, its data also tells a story about Marker's use of a specific software of which he had become a beta tester and a contributor, a story that started a decade earlier when he was working on *Zapping Zone*: that

[6] It was later released in English by publisher Exact Change twice, in 2003 and 2008.
[7] This display standard appeared in 1987 and stopped progressively being the main standard in the second half of the 1990s with the broadening of the 800x600 pixels display resolution. In 2001, only an estimated 7% of users were still using 640x480 pixel displays, while 53% were using 800x600 displays and the rest higher resolution monitors. (Source: statmarket.com February 17, 2001 based on a sample size of 50,465,595 web sites).

of HyperStudio. Through it, it also testifies of Marker's close relationship with its creator Roger Wagner, who is still active today and contributed to the archival procedures for *Immemory*'s original HyperStudio 3.0 files.

On another level, *Immemory*'s kinship with a form of self-contained archive of Marker's previous work, its evolution in time with Marker's additions until the late 2000s, and its incorporation into the *Gorgomancy* website as part of another archive-related entity, point out the importance of understanding and documenting what *Immemory* tells us as a puzzle piece into the broader picture of Chris Marker's body of work.

Interestingly, in his later years, when Marker builds his last computer-based interactive artwork, this time on Second Life with developer Max Moswitzer, he decides to embed the full *Gorgomancy* website as an interactive floating window in the 3D space of the « virtual world », thus incorporating again indirectly *Immemory* within it.

Recalling Amy Alexander's idea of « considering an artist's attempts to historicize their practice as an archived work in itself », Marker's practice of callbacks to earlier works and reuse of content throughout all his interactive pieces makes it highly interesting to consider somehow his artistic practice as that of an archivist of his own work – in the sense of amateur archivist practice. Not only in an art history perspective but also in the context of preservation, regarding his works as interconnected components and his practice as the construction of a personal archive, is undoubtedly one of the most enriching angles of analysis of his digital work.

It also highlights one of Marker's striking specificity compared to other artists who were producing artworks on CD-ROM in the 1990s, or virtual installations in Second Life in the 2000s: his age. Being already 76 years old when he released *Immemory*, and 87 when he worked on *Ouvroir*, Marker was belonging to a generation that had witnessed a much larger part of the century's history than younger digital artists, and he had been gathering images from this history throughout his lifetime as a photographer and filmmaker. He writes, in his introductory text from the 1998 CD-ROM booklet: "*In our moments of megalomaniacal reverie, we tend to see our memory as a kind of history book: we have won and lost battles, discovered empires and abandoned them. At the very least we are the characters of an epic novel*", followed a bit further by "*That the subject of this memory should be a photographer and a filmmaker does not mean that his memory is essentially more interesting than that of the next man (or the next woman), but only that he has left traces with which one can work, contours to draw up his maps*." [3]

Beyond the specific case of *Immemory*, these teachings from the ongoing preservation of Marker's computer works can extend in a much broader way to many of the

1990s and early 2000s interactive digital works. Arguably many of the CD-ROM works and web-based works of this era share common roots in the « archive exploration » feel of their navigation and structure, and several have had an history of re-coding or migration that tells us much today about the evolution of software standards for multimedia production and technology in general. Similar examples to *Immemory*'s migration path through Flash and HTML5 exist, such as Michael Snow's DVD-ROM *Digital Snow* from 2002, migrated online in Flash format in 2012 and in HTML5 in 2021. *Digital Snow* notably presents itself as an archive of Michael Snow's work, including excerpts from 84 of his works that can be explored by categories, interconnected with referral links throughout the archive. This typical organization of content with sections and subsections from a central menu leading to branched sub-menus, shared with many early web-based artworks, marks the entirety of *Immemory*'s construction and clearly evokes the experience of searching through an archive.
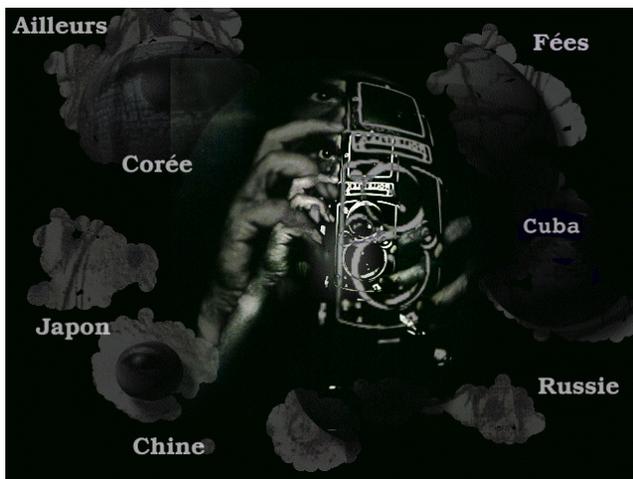
Figure 5. Example of sub-menu in one of the sections of *Immemory* (the PHOTO section). Image capture extracted from the original program.

The challenges of extensive documentation

It has been largely stated in publications on media art conservation how much the role of documentation is key in any preservation approach for artworks that go through several stages of change over time, whether they are material changes during migrations or even content changes decided by the artist. The extent and nature of the documentation produced, however, still varies a lot today in conservation studies, and the ways to achieve a documentation as complete as possible are still often researched and discussed.

During the Second Summit on New Media Archiving at ISEA2022, Byeongwon Ha stressed the need for an « inter-

locked archiving system including conceptual, technological, and phenomenological approaches. » [7] in the practice of documentation of digital artworks. While it is a recurring topic for digital art conservators and archivists to document as extensively as possible digital artworks, putting in practice the principle of a multi-facet documentation covering all conceptual, technical and experiential aspects of an artwork remains a daunting task, as it often asks for time-consuming research to build a case-specific approach. Documentation methods almost always have to be questioned and improved for each specific artwork, mostly when there is interactivity involved: even if the main relevant information such as technical specifications, exhibition history or installation plans are always obvious elements to collect, image documentation and ways to document how the user interacts with the artwork or how it is structured and browsed are much less standardizable and generally need a very advanced knowledge of the work prior to producing clear and legible documentation for the future.

In the case of *Immemory*, two main focuses emerged during the conservation study. One was aimed at producing legible representations of the hidden mechanics of exploration of the work, such as the clickable areas (which are not always apparent for the user, perhaps voluntarily in order to get visitors lost in the manner of a labyrinth) and what other « page » they lead to in the structure. The other one aimed to find relevant ways to inform the visitor of *Immemory*'s evolution over time, including its original materiality as well as its artistic changes between the CD-ROM version and the online Flash version.

To stay truthful to its two historical forms, the migration to HTML5 implied re-building again the full structure based on both the original 1997 program and the updated 2013 online one, which gave the perfect opportunity to dive into how this structure functions and how it can be mapped.

In order to archive a flat state of its whole content accessible in a single document for researchers and art historians, a large map of its arborescence was created, incorporating the 1552 « screens » (every « screen » being stored as an image file extracted from the original program) and documenting the connections between each, as well as which ones were added or changed in later versions. Each image in the map is kept at its original 640x480 pixels definition, so that it can be legible when zooming in different parts of the document, leading to a PDF file of 14000 pixels wide and 6700 pixels high. Animations and short video sequences that appear on certain pages, the only elements that could not be reproduced in such a document, are represented by icons. Finally, next to this map, extractions of the full 1552 images stored in each of *Immemory*'s categories folders and sub-folders (called « stacks » in the HyperStudio

program) are archived together with schemes of all clickable areas in each of them.

Figure 6. A preview of the map of the full *Immemory* tree structure including all its images sorted by sections and sub-sections.

A critical question that raises producing this type of documentation, perhaps too rarely explored by conservators when working on digital artworks, is how extensive documentation risk revealing too much and distorting or even spoiling the experience of an artwork? Certainly, if the map of *Immemory*'s tree structure is a valuable document for any researcher focusing on Marker's computer artworks, it can however be problematic to make it accessible to all visitors: if Marker intended his work to be a labyrinth and an invitation to wander, obviously a guide to each of its corridors was never meant to be provided.

Nevertheless, there are also elements that do appear relevant to provide to the visitor prior to stepping into *Immemory* today. The main one is arguably the opportunity to decide which version of the work to explore, the access to information on how this choice can influence the visitor's experience of the work. This includes the awareness of how computer equipment from the production era of the work impacted its aspect and type of interactivity, but mostly, in the case of *Immemory*, how some entire segments differ depending on the choice to explore the reconstructed CD-ROM version or the 2013 online one.

In order to address both these aspects, the development of the HTML5 migrated version incorporates an additional home page with a disclaimer mentioning how *Immemory* has evolved between 1997 and 2013 and offering the choice to explore either the reconstruction of the CD-ROM version with all the images fitting the original 640x480 pixels definition, or the updated version from 2007-2013 with the images upscaled to 900x675 pixels and Marker's modifications and additions included[8]. Since CD-ROM

artworks, similarly to web-based ones, do not have a specific model of computer unit attached to them and were produced to fit a range of computer systems commonly used at the time of their release, it is planned to produce visual documentation of the works' aspect and navigation on a typical computer system from the late 1990s, such as the 1998 iMac. Photographic and video documentation of an excerpt of navigation through the CD-ROM on this type of computer, with a cathode-ray tube display and rolling-ball mouse, will be accessible as additional documentation from this home page for the visitor.

Final words

Researching Chris Marker's *Immemory* and working on its preservation for the future reveals how much it exemplifies the relevance of considering certain media artworks as archives in themselves. With Marker's use of re-incorporation of personal documents, references, and quotes from earlier artworks, the topic of historicization is at the core of the artwork and thus requires to play an important part in its study when archiving it and presenting it to the public today. From its history of technological and artistic changes to the key position it holds in the broad picture of Marker's computer-based body of work, *Immemory* reflects the importance of understanding all the aspects carried by a digital artwork over time when undertaking its migration or its preservation in general. Whether these aspects are intentional from the artist – such as modifications or addition of content inside the work – or not, as in the case of artworks becoming testimonies of a certain technological era, documenting them often proves to go beyond the sole interest of researchers and art historians. In fact, it concerns the general public as well, as many of these aspects give not only valuable insight on when and how an artwork was produced, but also have an impact on the user experience of the work. Images that were upscaled over time to fit newer definitions of a new range of computer displays, when a digital work underwent updates and migrations such as *Immemory*'s path from CD-ROM to web-based piece, generate visual changes that are noticeable to many viewers. Visual consequences such as blurriness and images disturbingly marked by artifacts due to their inadaptation to larger display sizes, additionally to the effects of viewing images produced for CRT displays with a completely different frame on newer digital monitors, can hardly be seen as limited to a specialist matter and do impact every user's experience to some extent.

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[8] All the upscaled images in 900x675 pixels as shown in the migrated version were re-exported from the original 640x480 uncompressed sources from the original program, to fit both needs of presenting the

enlarged images of the 2007-2013 online version of work and still minimizing the compression artifacts that were initially due to technical constraints in the 2000s and led to some subtle but visible loss in the images used at the time in comparison with the original CD-ROM images.

Facing the challenge of sustaining the access to such artworks while staying faithful to the experience that they were intended to provide, the museum finds valuable answers in extensive documentation in all its forms. However, documentation of artworks like *Immemory* can strongly resist standardization and systematization as it also requires a critical reflection, most notably on how exhaustively it should be presented as available information next to the artwork for any viewer or not. As often in conservation, balance is key to all issues: if some documents can be solely destined to be viewed in research context to avoid the risk of spoiling the experience of the work, other information can however be necessary for the viewer to understand what he is experiencing, what changes it has been through and how it might differ from how it was originally experienced. Hopefully, people will still get lost in the labyrinth of *Immemory*, but with the choice of what labyrinth to get lost in.

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Authors Biographies

Alexandre Michaan is a media art conservator based in Paris. After graduating at the National institute for cultural heritage in France, and a stay at the conservation laboratory of LIMA in Amsterdam, where he worked on obsolete software-based artworks for CD-ROM, he has been since 2013 specializing in the preservation of audiovisual artworks threatened by obsolescence. He is currently working as a researcher, on a PhD focused on documentation procedures for the preservation of media artworks at Université de Saint-Etienne, and worked in the past years at Centre Pompidou on the digitization of video collections, and the conservation study of Chris Marker's video and computer-based installation *Zapping Zone*.

Philippe Bettinelli is a curator working in the New Media Department of the National Museum of Modern Art at Centre Pompidou in Paris. He has previously been in charge of Public Art in the French National Center for Visual Arts (Centre national des arts plastiques – CNAP), and curator in charge of Visual Arts, 1960-1990, in the same collection. Aside from new media and public art related issues, his research focuses on the crisis of landscape in modern and contemporary art, which was the subject of a three-years teaching cycle he gave with Baptiste Brun in École du Louvre. He has also been a member of the drafting committee of the journal Histoire de l'art, and is currently in the drafting committee of Perspective. Bettinelli studied Cultural Law at Université Paris Sud and History of Art at the École du Louvre before completing his studies in conversation at the Institut national du patrimoine (2014-2015).

Imaginaries in Becoming
The Dynamic Archive

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Abstract

Departing from one of the topics previously discussed in ISEA symposiums, this paper introduces an artistic research project, The Dynamic Archive (thedynamicarchive.net). As an open source, collaborative platform that collects processes and methods, it represents another direction in archival strategies in the age of computation. [1] The paper will also further explore the term "symbioses" by describing relations that occur within the project, such as the relations between curator and contributor, component and version, and its digital and physical presence. Since it could be regarded as a symbiotic organization that aims at creating symbiotic imaginaries, the paper will work through how these notions relate to The Dynamic Archive and possible alternative terms to consider. Taking the book *Symbiotic Planet* by Lynn Margulis as a starting point, the paper will look into notions such as Karan Barad's "becoming" (focusing on process), and "virtual" (or "non-local," as Denise Ferreira da Silva calls it). These positions question Western knowledge production and problematize what its systems imply. Our research project reflects on these terms, not only in trying to position itself among them, but in the very attempt to question them.

Key Words

Archive, symbiotic, processes, scores, sharing, becoming, non-locality, performativity.

Introduction
New Directions in Online Archiving:
The Dynamic Archive

The Dynamic Archive 01 (thedynamicarchive.net) has been an online platform since 2018. The platform compiles artistic and artistic-scientific principles, tools, methods, scores, and notes by artists and scientists, who make them publicly available to other artists, scientists, and cultural institutions for use, to copy, and to expand upon in different versions. New versions created through this type of usage are also uploaded onto the platform and can also initiate new versions or changes in previous components. Here, we can see a feedback loop whose theme is nothing less than a circulatory dispositive. [1]

As both a tool for collaboration and a practice, an archive consolidates a constructed knowledge system while also apparently doing nothing more than simply affirming it. Ultimately, though, an archive also puts the process of organizing knowledge up for negotiation. To put it bluntly, transformational processes seem to be an inherent element of the archive and therefore not only map constantly changing practices, infrastructures, and heterogenous spaces but also perform them, as well. In other words, the archive is continually creating and performing itself.

Building upon the paper from the second summit, The Dynamic Archive, as an online platform, considers archiving artistic strategies and methods in the age of computation. [1] Both Video-Policy media library (from now on MeViPol) and The Dynamic Archive are collecting Media Art and Data Art in a multidisciplinary field and are looking to find a way for the collecting process in connection to rapid technological development and changes. As with MeViPol, the intent is to collect documentation of media art and data art with the aim of protecting the art works as well as the audio-visual memory, The Dynamic Archive works more as an artistic research project, where the processes, methods, tools and scores are collected and offered always as possible starting points for further thought and change. As the text states: "MeViPol proposes a virtual space in which both the programming code with which the works are developed and the records generated for their development, both technical and conceptual is collected." (Alonso-Calero, Vertedor-Romero, Robles-Florido, 2022, p. 1) Where MeViPol collects recording and programming codes, the components of The Dynamic Archive consist of various parts (which we call 'nodes') that are represented by text (descriptions, instruction, poems, algorithms, manifests), video, GIFs, diagrams, images, audio. With their digital versions, The Dynamic Archive performs a collaborative knowledge production in the Arts and as such focuses on the process rather than the preservation of finished works. The Dynamic Archive, thus, questions the very notion of preservation in archiving in the digital age. In this

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1 Michel Foucault defines *dispositif* (apparatus) in the interview "The Confession of the Flesh" (1977) as "a thoroughly heterogeneous ensemble consisting of discourses, institutions, architectural forms, regulatory decisions, laws, administrative measures, scientific statements, philosophical, moral and philanthropic propositions–in short, the said as much as the unsaid. Such are the elements of the apparatus. The apparatus itself is the system of relations that can be established between these elements."

context, questions about performativity and the dynamics of an artistic-scientific archive in today's knowledge culture have been exemplified and researched in The Dynamic Archive project.

Collaborative work in general, and the sharing, copying and further use of modules developed by other members of a network in particular have become practices in communities in the arts, design, and academia in recent years. Open source strategies, cultivated in software development, have served as a model for these efforts. MeViPol is following this model in terms of the more technical approach to the documentation of the programming code, offering free access. Applying the methodology more often found in platforms that focus on processes related to software development, such as forking and branching, The Dynamic Archive began by considering what these methods of sharing can bring in the context of art, design, and media theory. At the same time, issues such as goals and motivations among practitioners, as well as questions concerning authorship, patents, and trade secrets concerning skills and processes have arisen. The Dynamic Archive sets out to discuss, probe, and develop these questions with a focus on theatre and performance, media arts and design, as well as software design. In this sense media art and performance art are in our focus, as these fields often imply collaborative and cross-disciplinary working approaches. Besides these fields, The DynamicArchive works with others as well (painting, drawing, music, fashion etc) and encourages the possibility of the methods from one field being developed by a practitioner of another, looking for potential in otherwise unrelated disciplines.

In terms of curatorial practise, both ViMiPol and The Dynamic Archive consider the coexistence in relation to multidisciplinary approaches. MiVePol focuses on otherness and territorialization: "at a time when the figure of the other, the body, the subject, the territory and, in short, coexistence are inevitably crossed by these digital technologies." (Alonso-Calero, Vertedor-Romero, Robles-Florido, 2022, p. 2) With The Dynamic Archive the 'otherness' in terms of individual authors and identities is less relevant, as the focus is on process and collaborative practise.

Once the components and version are presented, beyond their digital environment, in the physical space of the program Version room, this multidisciplinary principles are contextualised within each different Version Room and become situated knowledge. As the digital platform moves and performs, its physical manifestations become pockets of stillness where one can linger in the process and knowledge that has been created at that specific point in time and space. In this situation, the collaborators who, most probably have not met beyond the digital platform, get to connect and collaborate together in the space of the gallery.

As the starting point of the collaboration, artists and designers provide The Dynamic Archive with their working methods and processes (as notations, software, technical specifications, patterns, scores, tools, rules, texts, principles), in order to make these resources available to others for use and further development. In the context of The Dynamic Archive these working methods and processes are referred to as "components." The main part of this research project is the iterative implementation of the digital archive itself in the form of the web application thedynamicarchive.net, and the continuous addition of components to the archive. The archive allows for the copying and modification of already archived components. In the context of The Dynamic Archive, these modified copies are referred to as "versions." The new "version" of a component preserves the connection to its source component.

In this respect, the curated platform is as much a tool as it is a collection. The components of the archive are by no means static and might well permanently undergo changes and developments. Components are only categorized in a vague fashion but can be searched by these categorizations as well as through full-text searches. The archive is open to the public, and thus such inquiries can be initiated by anyone visiting the archive.

> The Dynamic Archive—an unstable archive, constantly evolving and shifting—offers a possible avenue to an exploration of opacity, challenging conventional Western epistemologies—fugitive shadows that stubbornly refuse to make themselves fully transparent." (Definition by Luiza Prado). [2]

In reflecting upon the function and location of the archive and the production of knowledge, one focus is always on the status of the archive as both a public entity and an effective organ of knowledge. The categorical turning point in the process of increasing digitalization already noted in the nineteen-nineties (along with the accompanying paradigm shift from systems of written records to structures for linking and networking, all the way to concepts of collective intelligence) have had significant influence upon the techniques, methodology, and technological realization of archives. This turning point also directly impacted the components of the archive itself (objects, events, notes, data), which depend upon their location in the archive as well as upon researchers and infrastructure. In their book *An den Grenzen der Archive* (At the Borders of Archives), which refers to the archives as systems of knowledge production in the digital age, the editors write: "Today, archives appear less as stable places for custody and more as flexible knowledge networks. They have moved at their limits and at the same time become more concrete and abstract." (Bexte, Bührer, Lauke, 2016, p. 7) When discussing the decisive role the relationship between materiality and digitality play in twenty-first-century art archiving, they write that by thinking of the archival within the Internet, the archival becomes more abstract while at the same time becoming closer or more available. When thinking of archival processes in the arts and design, The Dynamic Archive can be seen, as they put it: "as artistic investigations at the boundaries of the archives" and as such, it questions the standard that an archive implies.

Reexamining Standards

The Boundaries of Symbioses, Towards Becoming Imaginaries

In her well known book *Symbiotic Planet,* Lin Maruilis refers to the term "symbioses," first defined in 1873, as the co-existence of very different kind of organisms. In some cases, symbioses, she writes, would result in symbiogenesis, which implies the appearance of new organs, bodies, or species. (Maruilis, 1998, p. 33) Furthermore, she writes, what becomes apparent in these new organisms that are created through symbiotic mergers is that many of them lose what is, in retrospect, seen as "their former individuality." What these terms imply is that organisms as such exist as separate entities and that, through time and physical contact, they not only influence each other but are dependent on one another. In some cases, they create new, separate entities via their mergers. Symbioses implies physical contact between individuals that are regarded as separate organisms. In the context of knowledge production, the concept of symbiosis could be seen as a metaphor for the way in which different fields of knowledge or ways of thinking can interact and influence each other. At the same time, the term can be reconsidered with a reflection on the Cartesian divide or the separation of mind and body.[2] This separation has had significant implications for how we understand the relationship between the physical world and the mental or subjective experience of it. The problematics of the Cartesian divide might be relevant when considering how we understand and integrate different forms of knowledge, such as scientific and artistic knowledge, or knowledge that is based on objective observation and knowledge that is more subjective or interpretive.

In some ways, The Dynamic Archive could be seen as a symbiotic organization. Let's look into some of the relational processes with which it operates: curator-contributor, component-version, and physical-virtual. To begin with, it collects processes from different contributors through an initial interview process. After a first contact, an interview or conversation with the artist or designer is conducted by a member of The Dynamic Archive team. This step serves as a way to discuss and reflect upon the contributor's work methods and processes and how they can be represented as a component in the archive. In this conversation, both sides try to explore the idea and the method together, with one coming from the position of the platform (The Dynamic Archive's structure and intent) and the other from their own practice, resulting in a new organism known as a "component." Through their subsequent versions, new processes and collaborations are created. As the components and versions start building on each other, in some cases a loop is created where it cannot be known which one was created first. The authors' names can be seen, but it is not always evident who is attached to which content. The question here is how individually or separately these processes can be perceived, or, how separate do we want them to appear? In promoting the components, rather than their authors, what becomes more present in the archive is the method as the process of creating knowledge rather than the person who created it. Each component and version appear as expressions that are not isolated or disconnected from the other things that exist in the archive; rather, they are connected or intertwined with them in some way. In her text "On Difference Without Separability," Ferreira Da Silva questions the notion of "the other." "The other," she writes, can be understood as something that is different or distinct from oneself or one's own group. She suggests thinking of these expressions or entities, not as separate from one another or from the larger system in which they exist, but as being inextricably connected to each other and to the whole. (De Silva, p. 59) This idea challenges the traditional notion of the other as something that is fundamentally distinct or separate from oneself; therefore, we suggest that it challeges the very principles of symbioses.

> Dynamic changes produce traces, and traces entangle history. Within a dynamic archive, stories shape-shift from enclosure to enclosure, wrappings to wrappings, casings to casings, contexts to contexts, all the while documenting change. Dynamic change is the matter of any archive, and any archive is subject to change. The archive is not the sum of what is read in it, nor the sum of what is written on it: Hybrid, diverse, unbounded, the archive is the ephemeral stage upon which change happens and is stratified into history. (Definition by Luiz Zanotello.)[3]

Perhaps an example of a component-version relation might help demonstrate these ideas. One contributor, coming from the fine arts, decided to share her illustrations of silhouettes, eyes, and adjectives. Another contributor, from digital media, took these elements and created a software based on an ancient Chinese divination tool, the I Ching. He programmed different characters that emerge through diverse combinations of the elements from the previous contributor (eyes, silhouettes). Finally, a text from the I Ching is attached as their description. On the other hand, another contributor decided to create their own characters and animations, new creatures named "quadrupods" inspired by the initial offerings of eyes and silhouettes. One can tell only through the chronology of their contribution which one came first, but they do not really have any hierarchy embedded in them. Kati, who made the initial contribution, was unsure why anyone might be interested in these elements, but through the interview process still decided to contribute (see fig. 1). What has been important here is how different knowledge systems connect and create

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[2] The problematics of the Cartesian divide refer to the separation of mind and body that was proposed by philosopher René Descartes in the 17th century.

around the same idea viewed from different perspectives in a way we as curators could not foresee.

Figure 1. The Dynamic Archive Platform. Example of component-version. Screenshot.

These continuous contributions to The Dynamic Archive are what make the project a complex system that is difficult to disentangle, or to understand solely through its separate expressions. They have as much to tell about the project as the project does about positioning them.

When seen in their entanglement, the processes or the way they e(merged) contain the possibility of collaborative process where the focus is uncovering the previously unknown or not-thought-of. As different disciplines relate to each other and create new components, one can think of the knowledge created in the archive rather as knowing, as entangled, as becoming, as performing, and never really finished.[3] Knowledge that is created in the archive is not simply something that is thought or studied; it is also actively expressed or performed in some way. This idea of knowledge as a continuous notion suggests that it is not something that can be fully understood or grasped at any one moment but is always in a state of development or growth.

From Physical (Separate) to Virtual (Non-local)
Symbioses, by definition, considers physical contact and the changes that emerge through this contact. When we then think of digital processes—on one hand, the complexity of the code defining them and on the other, the overwhelming presence of vast data—is it even possible to think of separate entities and their merging behaviors in

any controlled way? The immateriality or virtuality can make it difficult to understand and analyze the relationships and systems that make up the internet, because these relationships are not always visible or tangible. In the context of digital archives and media art in general, this relation of physical (separate) and virtual (non-local) has to be considered.

In reexamining the archive as a standard for collecting and preserving knowledge, The Dynamic Archive examines the principles from which knowledge production stems, and which are used to create knowledge. Ferreira da Silva addresses the difficulty in perceiving the world as separate entities that influence each other, simply because the power that arises in such a hierarchy always determines the knowledge that is produced and how it is produced.[4] She calls for a radical shift in how we approach matter and form. From the physical, as a way of Cartesian, deterministic understanding of the human condition, toward the virtual, since Ferreira Da Silva considers the virtual as the no local.[5]

It reveals that there is more than one way to do anything, and that projects include plural horizons that turn into complex maps rather than straight lines. It is a glimpse into personal and intuitive experiences, abstract thoughts, associations, metaphors, modes, codes, and ways of seeing that are usually and too often excluded from representation. (Definition by Johanna Mehl.)[4]

If we think of The Dynamic Archive as an apparatus for knowledge production, the project always reflects on itself and the structures it works within. Apart from the web application and the components, this research project is also concerned with the caveats, risks, and dangers that can potentially arise from such a process. What sorts of commercial structures that unfold beyond copyrights, licensing, and patent disputes (while tending to privilege growth and profits) must and should be anticipated? How can The Dynamic Archive avoid repeating and reinforcing such structures and tendencies? A critical perspective on archives and collection such as The Dynamic Archive is needed, and the research project aims to develop such a perspective in parallel with the archive itself. Next to the web application hosted on the platform thedynamicarchive.net, a series of other activities pertaining to the research project—such as discussion processes, conferences and workshops, exhibitions and performances, publications and the artist in resi-

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[3] Relying on particle physics, author Karen Barad, argues that agency is not given or attached to any one entity, but that it rather appears through the process of entanglement. Therefore we can think of knowledge always in becoming (dynamic, changing, related to the known and to the unknown) rather than a fixed knowledge system.

[4] As Karan Barad and Ferreira da Silva as well looks into particle physics, among other arguments, in order to make explicit the fragility of western systems of knowledge production.

[5] The principle of nonlocality, also known as quantum nonlocality, is a concept in quantum physics that refers to the idea that certain physical phenomena cannot be explained by classical physics and cannot be localised in time and space.

dency programs—can be found there. These formats aim to contribute to the development of an open and collaborative platform with regional and international dimensions to examine and experiment with the structures of The Dynamic Archive.

The archive also can serve to discover processes of accommodation, while also advancing critical positions. Here, transcultural questions and issues come into play in significant ways. They are expressed in the actual work of translations that show "situated knowledge" in use at the archive as it operates.
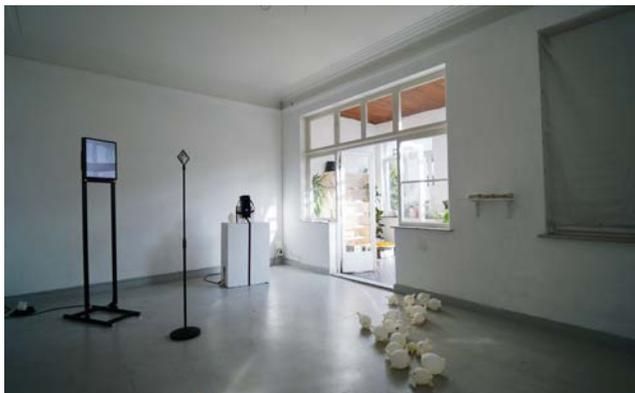

Figure 2. Version-room at gallery Circa106. In the middle of May 2022, during their Version Room residency at Circa 106, Heike Kati Barath, Lui Kohlmann and Julian Hespenheide transformed the gallery space into an open invitation to encounter chance and choice from three different perspectives. Between the three different components, a Projection-Animation, a Software Oracle and anthropomorphic life forms, common themes of repetition, randomness and selection were shared. © Jimmy Dao Sheng Liu.

Summary

As a structure in constant motion that considers itself a starting point for further development, The Dynamic Archive works as an online platform and a physical space (versionroom) in a gallery (Circa106) hosted by the University of Arts Bremen, where it shows mainly its components and versions (see fig. 2). Within this complex reality of physical and virtual, it rehearses the possibility of unknown, accepting the experiment as its intent. To imagine the archive as something different from an orderly whole consisting of separate components that relate through some sort of measurement, we must accept the uncertainty of its results and stay focused in rehearsing this uncertainty. In this sense, this paper positions the project The Dynamic Archive in the context of the new directions in online archiving, considering the text itself as preparation for further thought. In embracing the nature of uncertain process lies perhaps the only fixed position of this dynamic project.

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Author Biographies

Irena Kukrić's (1983) practice and research are related to the absence of the human body in time-based installation performance. Her performances focus on the balance between digital or mechanical dimensions of the works and on the poetics of human experience through non-human actors.

Irena studied scenography at the Faculty of Applied Arts at the University of Arts in Belgrade, Serbia, and Digital Media at the University of Arts in Bremen, Germany. She is currently a PhD candidate at the PhDArts Leiden (in collaboration with the University of the Arts Bremen). In 2012 she interned in the installation department at MoMA PS1, New York. Irena lectures at the University of Arts Bremen and is a coordinator and researcher in the research project The Dynamic Archive at the University of Arts Bremen. She was born in Belgrade and divides her time between Bremen and Berlin.

Marcela Antipán Olate is a designer and artist interested in technology as expressive media. In her practice, she combines concepts that are indistinguishable from the arts, sciences, or other fields. Within that framework, one of her main interests is the critical reflection on technological objects of daily use and their symbolic and technical connections in relation to politics, economies, ecologies, and cultures. With a background in graphic design, functionality, and speculative narratives intertwined with her processes, Marcela's work translates into physical objects, software, research, visual pieces, and program-driven poetry.

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Sick studied German language and literature, politics, cultural sciences, and the history of art at the universities of Heidelberg, Bremen, and Hamburg. In 2001 she obtained a doctoral degree at Hamburg University in Media Studies with a dissertation on the interactions between knowledge (production) and cartography. One of Sick's main research projects is The Dynamic Archive. Together with Ralf Baecker and Dennis Paul, she has been curating the Salon Digital: Reenactments in Art, Science and Technology (salon-digital.com) since 2016. She is also the editor of the *Manifestos Publication* (manifesto.de).

Method for Design Materialization (MDM) for artists, educators and archivists: an introduction

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Abstract

This contribution argues for the potential of Barr, Khaled and Lessard's Method for Design Materialization (MDM) as a research through design tool that is specifically suited for new media preservation. Building moreover from the ISEA first and second Summits on New Media Art Archiving, this article introduces the reader to this methodological and epistemological design framework through four existing articles: both addressing important issues in the context of new media practice, education, display and archiving. Placing these articles in dialogue with four structuring ideas of the MDM initiative, it posits the importance of further introducing new media artists to processes of self-archiving through the use of cohesive platforms such as MDM.

Keywords

Method for Design Materialisation
Research through design
Version control system
Self-archiving

Introduction

This contribution argues for the potential of the Method for Design Materialisation (MDM), a research through design framework that aims to centralize and archive the multiple trajectories of a design process through the use of the Github platform and the Git version control software [1]. Drawing from four articles from the ISEA first and second Summits on New Media Art Archiving: Ha [2], Mordell [3], Lurk and Enge [4], Arets, Huynh, Althaus and Altena [5], this paper situates MDM digital archiving as a response in dialogue with these reflected concerns. Building from Byeongwon Ha [2], this contribution first expands on the potential of the MDM for art and design practitioners: enabling them to methodically archive their process in order to further ground their rationale and concepts. Drawing from Mordell [3], this paper then situates the MDM as a valuable asset for new media pedagogy and education: enabling design teaching in a more interactive and systemic way in placing it in dialogue with the production of an archive within educational

contexts. Third, it expands on the insights from Lurk and Enge [4], offered by the MDM in the context of displaying archives. Finally, the contribution will revisit Arets, Huynh, Althaus and Altena [5] at the level of the MDM's possibility for archive analysis using computational tools.

MDM *logs*: Archiving the process of new media practitioners in order to further ground their rationale and design claims

Method for Design Materialization (MDM), initially developed by Khaled, Lessard and Barr [1] at Concordia University, takes its roots from research through design : an academic epistemological framework interested in conducting research through the process of production of arts and design artifacts. From this perspective, the method draws therefore from Schön or Cross, key theorists within the design discipline to whom what is at play is the posture of "reflection in action" [6]: inviting designers to be critical through the making, in an iterative and prototype-oriented [7] way. This research creation posture asks, however, foundational questions about the relevance of materializing and archiving such crucial processes of reflection in action. These questions echo Ha's preoccupations, in which he offers a system for archiving and documenting the evolution of concepts and technical embodiments produced in the making by new media artists. It is moreover from this desire, to create well-organized archives helping artists and theorists research through such new media projects [2], that we argue for the pertinence of the MDM framework: as a model which structures the production and materialization of such conceptual critical making [8] insights. In this context, the MDM proposes to use the affordances of Github, an online platform built on top of the Git version control software used by new media artists and programmers to archive and keep trace of their code. Through the use of Git and Github platforms specifically, MDM invites practitioners to create a regular design diary (or entry *logs*) : in which all the stages of the design process are conscientiously documented and archived online.

MDM (and Github) *issues*: interactive and situated pedagogy in dialogue with the process of archiving

In addition to the potential of the MDM to further connect and centralize concept archiving within the production and materiality of new media, we also posit that this method can be suited for pedagogy through design by means of integrating archival practices. Drawing from the previous section, we argue that MDM is a foundational asset to further integrate new media pedagogy with the production of technical and conceptual archives made during the creation of new media projects. This also echoes with the contribution of Mordell [3] inviting us to implement methodically rigorous archiving processes within academic media arts programs and, paired with Ha's claims, to develop archives *in the making*. Drawing from this need to further embed new media pedagogy into the active production of archives, our article argues here from the potential of the MDM and Github's *issues[1]*: a feature enabled by the platform, allowing design educators to reference and interact online with any content published on the history of the project's repository. In addition to Ha's claim for the centralisation of technical and conceptual insights materialized during the process of creation, we posit here that this contributes to further bridge the gap between archiving processes and education. In other words, it creates for external researchers and historians the conditions for an archive in dialogue: where the evolution of such new media projects inside their academic contexts is kept and centralized inside the repository.

MDM *builds*: centralizing and tracking the project's design and experiential evolution through time

Third, this contribution invites artists and design researchers to explore the potential of the MDM's *builds* [9]: taking the form of blueprint prototypes that correspond to the actual stage of the project's materiality and design. In the context of (online-based) new media preservation and archiving, the method moreover proposes here to centralize the different iterations of a project through the use of Github Pages[2]: a web publishing tool enabling artists to quickly materialize and publish their design iterations and code. Generating a unique Uniform Resource Locator (URL) for each of these archived design "builds", new media practitioners and researchers can then embed and refer to these URLs on their MDM logs (section 1) and

issues (section 2). From this standpoint, this aspect of the method aims to tackle problematics related to the displaying of archives, exploring therefore how such builds can be shown and disseminated for a broader audience. In addition, the MDM invites practitioners to centralize and further embed such builds into their work-in-progress archives, in order to facilitate the access of these materials by exhibition curators and researchers. This echoes with Lurk and Enge's contribution [4], in which the building of a web infrastructure comes into play in order to provide a means of centralized content to the various platforms of an exhibition space [4]. Drawing from this standpoint, MDM invites us, here, to further embed these designed outputs inside the archives. In other words, MDM serves here as an open-source and accessible infrastructure facilitating archival display: through connecting directly to the artist and the produced content centralized within the archive.

MDM (and Github) *insights*: using computational methods for querying and further understanding the archive

Finally, we argue for the potential of the MDM in order to further understand the new media archives produced and developed by practitioners through the lens of computational tools. More specifically, we propose here to zoom in at the level of Github *insights[3]*: a feature offered by the platform that enables us to query, sort and visualise the project's repository and semantic data through keywords or parameters. This aspect of the MDM echoes, here, with the contribution of Arets, Huynh, Althaus and Altena, in which they explore the use of Artificial Intelligence (AI) in order to unlock new understandings of our past journalistic archives [5]. Going back to new media archiving, this contribution posits here that such computational methods available through Github are crucial assets for researchers conducting *cold analysis on media*: analysis conducted once the project is fully completed by its author. In other words, this feature enables researchers to explore the archive in a less linear and timeline-based way, researching through these *insights* on new paths and configurations of the archive shedding light on the author's rationale, motivations, technical issues and process of creation.

Conclusion

In this contribution, we expand from four articles of the ISEA first and second Summits on New Media Art Archiving in order to situate the pertinence of the MDM.

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[1] More information about Github *issues* can be found here: https://docs.github.com/en/issues/tracking-your-work-with-issues/about-issues

[2] More information about Github *pages* can be found here: https://pages.github.com/

[3] More information about Github *insights* can be found here: https://docs.github.com/en/enterprise-cloud@latest/organizations/collaborating-with-groups-in-organizations/viewing-insights-for-your-organization

Drawing from Ha [2], we first explored the role of the method as a platform materializing the process of new media practitioners. This production of a design *logs* diary is a foundational asset helping research through design practitioners to further contextualize their claims and rationales. At the level of Mordell [3], the contribution then expanded on the possibilities opened by MDM *issues* in order to further embed and connect new media education and pedagogy to the production of archives. In bridging new media archiving with education, our contribution argued for the importance of interacting with platforms enabling process follow-up that, at the same time, are integrated to the work in progress archive. From Lurk and Enge's contribution [4], we then shed light on the role of the method's *builds*: centralizing and making accessible the materials and artworks produced by the project's author in a more straightforward way. Finally, we connect our contribution to the article of Arets, Huynh, Althaus and Altena [5] in order to explore the potential of the MDM *insights* for new media researchers and historians.

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Biography

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-Archive Presentations-

ACM SIGGRAPH History Archive Comes Alive: 50 Years of Innovation, Creativity and Ground-Breaking Achievements

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Abstract

The ACM SIGGRAPH organization is developing an online archive showcasing information about presentations and experiences as well as artifacts and the organization's history. A physical archive was also established to supply information necessary for the online archive. In August 2023, SIGGRAPH will celebrate its 50th conference and the materials in the archive will be used in displays of collectables and other artifacts, visualization posters, interactive kiosks and an immersive, interactive time tunnel.

Keywords

SIGGRAPH, archive, innovation, creativity, time tunnel, exhibition

Introduction

The Association for Computing Machinery (ACM) is a scientific and educational professional society on computing. ACM SIGGRAPH is a Special Interest Group of the ACM focussed on Computer Graphics and Interactive Techniques. Since 1974, the SIGGRAPH organization has hosted an annual conference showcasing some of the world's most innovative and creative research and endeavors in the field. The ACM SIGGRAPH History online archive serves as the central repository for information from the SIGGRAPH conferences along with other SIGGRAPH organization content. This online archive is supported by a physical archive housing thousands of publications, artifacts, and documents.

Contents of the Online Archive

The online archive is divided into a number of sections accessed via an interconnected menu and icon system. One method of accessing the conference-related material is via the Conferences menu. This page aggregates entries from multiple sources and is a comprehensive view of all information, presentations, experiences and artifacts related to a particular conference. The Contributors menu allows the user to view people by Type, select a contributor alphabetically or find a person via the search field. The contributor pages display all contributions from multiple categories such as presentations, artworks, leadership roles, etc. In essence, the page is a CV of a person's contributions to the SIGGRAPH organization over the years.

The SIGGRAPH conferences have a number of different types of presentations, exhibitions, hand-on experiences, demonstrations, and screenings and these have changed significantly over the years. The online archive offers access to information related to presentations that were given at the conferences via the Learning menu. Learning includes: Art Papers, Courses, Educator's Forums, Keynotes, Panels, Posters, Short Talks, Technical Papers and other types of presentations. The Experience menu contains information about: Appy Hour, Art Exhibitions, Computer Animations, Emerging Technologies, Extended Reality, Real-Time Live, the Studio and other experiences. The online archive also includes Awards, inventories of artifacts in the Master Collection physical archive and images of collectibles given out at the conference. In the next year, the intent is to also include information about the organization itself and communities within it.

Making an Archive Come Alive

In August 2023, SIGGRAPH will have its 50th conference celebration and there will be a series of retrospective talks, experiences and displays. The materials in the archive will serve as fodder for a series of displays, information visualization posters, interactive kiosks and an immersive, interactive time tunnel. Using the latest technologies such as AI, robotics, XR and electronics combined with the SIGGRAPH community's ingenuity and creativity, this event will prove to be a centerpiece of the SIGGRAPH 2023 conference in Los Angeles.

Acknowledgements

ISEA Symposium Archives: Recent Developments

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Abstract

This presentation focuses on the ISEA Archives team's latest efforts in improving its online repositories to preserve the records of the ISEA Symposium series, a nomadic international cultural exchange experience over the last four decades: archiving the contributors and their works, including the documentation and videos of the paper presentations, artistic creations, presentations, exhibitions, performances, concerts, workshops, general events and the symposium organisation itself.

Keywords

ISEA, archive, symposium, preservation, electronic arts, digital arts, new media art, research repository, YouTube channel, connecting archives.

Introduction

Archiving a large nomadic symposium, consisting of academic papers and all kinds of art events that have been running for 35 years on all continents of the world, is a huge task. To do this without any financial means is an almost impossible job. Yet the ISEA Symposium Archives still manage to do this. In this talk, presenters from the ISEA Archives will guide you through the Archives' latest developments.

ISEA Symposium & Archives: Brief History

When the idea of the ISEA conference (subsequently called symposium) was conceived by Theo Hesper, he and Wim van der Plas started to work on realising it. The explicit aim was to start a network of organisations interested in the relationship between art and science. Even though they called it FIRST International Symposium on Electronic Art, their thoughts were not about starting a symposia series. History decided that after the first two symposia in the Netherlands, it was wanted in Sydney (AU), Minneapolis (US), Helsinki (FI), etc. And so, ISEA became a nomadic event. This nomadic character became one of its main characteristics.

ISEA was global, making it hard to find subsidisers or sponsors who would support a central organisation. Thus, coordination of the series of symposia was in the hands of unfunded volunteers (and that largely still is the situation). Due to these circumstances, there was never really a well-kept central archive. In 2006, a one-time subsidy by the Mondriaan Stichting (NL) allowed ISEA to start building an online archive. The first version was presented at ISEA2008 in Singapore.

ISEA Symposium Archives: Recent Developments

The ISEA Archives are currently archiving all the ISEA symposium editions with two versions of online archival repositories: the ISEA Classic Archive and the ISEA New Archive [1][2]. Both archive versions are constantly updated with information about the symposium series during the transition phase of fully migrating from the Classic to the New ISEA Archive. The Classic Archive has now included the full documentation of ISEA2022 (Barcelona), including a large amount of videos of the 2022 symposium entered to YouTube, where the archives have their own channel [3]. Also, during the last year, a large number of analogue video tapes from early ISEA symposia have been digitized and included in the YouTube channel, thanks to some financial help from the Heritage Volunteers Fund (NL).

The Classic archive is a text-based version developed in 2012 to restore the archival data from the earlier version started in 2006. To improve on the Classic, the New archive version was created in 2019 with enhanced data structures and embedded metadata, allowing better data management and searchability. Moreover, the New Archive can handle thousands of images, videos, and other rich media.

Nevertheless, data migration and developing a new archive repository pose a considerable risk of incorrect or lost data during the process. Some errors are easier to identify, but some of these inconsistencies need thorough cross-checking between the two versions. It is a very time-consuming process, and it can only rely on experienced archivists and trained volunteers in the archive team to proofread the content.

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Authors Biographies

Wim van der Plas is co-founder of ISEA and organiser of the three ISEA symposia held in the Netherlands. He led ISEA HQ in the first 8 years of its existence and was a board member of the Inter-Society for the Electronic Arts and ISEA International (both of which he also was co-founder) until 2017. Since then, he is Honorary Chair of the ISEA International Advisory Committee and ISEA Symposium archivist. He received a Leonardo Pioneer Award in 2018.

Bonnie Mitchell is a new media artist and Professor at Bowling Green State University in Digital Arts, in Bowling Green, Ohio, USA. Mitchell is a member of the ISEA International Advisory Committee and ACM SIGGRAPH History and Digital Arts Committee where she focuses on the development of their online archives. She is currently the SIGGRAPH 2023 conference History Chair in charge of the immersive Time Tunnel, history displays and retrospective talks. Her current creative practice focuses on development of physically immersive data visualization environments that showcase climate change over time. Mitchell's artworks explore spatial and experiential relationships to our physical, social, cultural and psychological environment through interaction, abstraction and audio. She has created numerous abstract visual music installations and animations that have been shown in hundreds of venues world-wide.

Jan Searleman taught Computer Science at Clarkson University for 37 years, retired in 2015, and since retirement has been an Adjunct Research Professor at Clarkson. Her research areas are Virtual Environments, Human-Computer Interaction, and Artificial Intelligence. A senior member of the ACM, Jan is also on two ACM SIGGRAPH Committees: Digital Art (DAC) and History. Jan and Bonnie Mitchell coordinated a DAC Online Exhibition "The Earth, Our Home: Art, Technology and Critical Action". She is co-director of the ACM SIGGRAPH History Archive with Bonnie Mitchell. Jan also co-directs the ISEA Symposium Archive with Bonnie Mitchell, Wim van der Plas, and Terry C.W. Wong.

Terry C. W. Wong is an archivist and co-organizer for the ISEA Archives. He has a bachelor's degree from the Applied Science Department of the University of British Columbia and a master's degree in fine art from the Chinese University of Hong Kong. Currently, he is working on his graduate research study on connecting new media art archiving worldwide in the School of Interactive Arts and Technology at Simon Fraser University. Terry has been involved with the New Media Art Archiving Summit that takes place at a few editions of ISEA. He is currently a member of the organizing committee for the Summit. Before working in new media art archiving, he was also an engineer, artist, and member of the ISEA2016 organizing team.

Activating Archival Research at V2_

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Abstract

V2_, Lab for the Unstable Media is an interdisciplinary center for art and media technology in Rotterdam that strives to build a 'living archive' of electronic art, based on documentation of more than 40 years of activities by V2_. This short presentation reflects on the work of three researchers who were commissioned to do archival research connected to the V2_archive in 2022. They presented their findings both in the form of a text and as part of a monthly radio programme by V2_. These commissions were part of V2_'s effort to show that it possible to tell *different and diverse* histories of electronic art.

Keywords

Living Archive; Electronic Art; Art History; Dissemination; Radio; Essay; Archival research

Presentation

V2_, Lab for the Unstable Media is an interdisciplinary center for art and media technology in Rotterdam (the Netherlands). Founded in 1981, V2_ creates a context in which issues regarding the social impact of technology are explored through critical dialogue, artistic reflection and practice-oriented research. V2_ organizes events, artist residenies, curates exhibitions, publishes books and commissions new work and research, Since the start, V2_ has archived documentation of its activities, which has resulted in an online archive that is freely accessible on its website. It contains descriptions of more than 1,300 events organized by V2_, along with about 600 accompanying texts, such as essays and lectures, as well as descriptions of about 1,000 works of art and other projects presented, produced and/or published by V2_. Linked to these items are videos, ranging from full recordings of events to brief interviews with artists; scanned program booklets and PDFs; and thousands of photographs. V2_ strives to activate its archive in order to give insight in the evolution of the field of art and technology. Given the important role of technology in the formation of our society, such insights are of great-value for the field of contemporary culture, for current art production, as well as for the general public.

The V2_Archive is guided by the idea that we need archives in order to be able to tell (or construct) histories of art and technology, but that archives have no use if no art histories are written. In the case of V2_ this means that its archival efforts are as much focused on issues of preservation ('keeping stuff') as on ways to produce new perspectives on the histories of the electronic and digital arts. V2_ works from the assumption that its archive does not represent a universally valid history of V2_ or of the domain in which it operates: it contains a potential for such histories to be written.

The documentation that the V2_archive offers is used to create different stories about the past, that might give insight into the now and the future – especially with regard to the effects that technology has on the arts and on society. These *different* stories, challenge the singular innovation-oriented narrative that sometimes still dominates the historical analysis of the field of art and technology.

Enabled by a small grant from the Dutch NADD (Network Archiving Design & Digital Culture), V2_ commissioned three researchers to write an essay on a subject of their own choice relating in some way to the archive of V2_ and the history of the electronic arts. These commissions were presented as part of V2_'s monthly radio programme. Artist and 'accidental archivist' Victoria Douka-Doukoupolou focused on the development of laptop orchestras and the work of Cor Fuhler. Her archival research connected materials from the archives of the Holland Festival, Sonic Acts, V2_, the BIMhuis as well as personal archives. [1] Researcher Kiki Lennaerts wrote about the preservation of immersive media art, and the notion of 'anticipating obsolescence'. [2] Researcher and writer Katía Truijen looked at V2_ 's archive as a space and memory for art and technology, and speculated how V2_ reflected on this throughout its 40 years of existence. [3]

Indicative of the interest of these emerging researchers, all the contributions unearthed some aspects of a history of V2_ that are not often highlighted, or that are overlooked or forgotten (even by people who work at V2_). This further suggests the importance of such efforts to keep an archive 'alive', and bring it into contact with different contexts, in order to produce new views and new meanings. By doing so, archival research can produce new perspectives on the interplay between technology, the arts and society, that are relevant for now and the future.

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Biography

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Auto-archiving 20 years of Pixelache Helsinki

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Abstract

Pixelache Helsinki is a Finland-based creative association on emerging creative practices with almost 20 years of activity in 2022. As part of their 20th anniversary, various strategies were taken to engage with the associational history: 7 processes or events were planned, produced, and reflected upon which engaged with membership involvements, what was left behind in the production office, guided walking tours through the festival's past venues 20 years before, podcasts, as well as inviting an internationally-respected external perspective for 'another story'. Each offers a reflection on what it might mean to try to archive and narrate an association's own history from multiple and diverse angles. This presentation is the start of a new story.

Keywords

Auto-archiving, Community archiving, Festival associational history, Association archival strategies, Workshop design, Event design

Introduction

Pixelache Helsinki is a Finland-based creative association on emerging creative practices with almost 20 years of activity in 2022. Beginning with 1st edition in 2002, the association was legally formed in January 2003. Starting as a Festival of Electronic Arts & Subcultures for the first decade, over the second decade the association has been running a self-described trans-disciplinary platform for emerging art, design, research, technology and activism. [1]

As Finland's longest running media arts festival has maintained an open-mindedness to emergent changes in all related festival aspects, that has been based initially on demoscene and open-source culture [2] [3]. That includes organizational formats, content presented, software and hardware promoted, various participants as contributors, guests and association members, in an intersectional mix of cultural, gender, technological, national and identity backgrounds. The festival has gained a reputation for not only presenting and supporting emerging practitioners, as an association it also dynamically adjusted it's production formats to offer support and empower those involved and what they do. However, this diversity has came with a consequence, that there have been changing generations of persons involved in the core production team, the festivals over the years, and many persons have moved on to do different things, even if they have stayed in the same city. [4]

In advance of the Autumn 2021 cycle of annual funding applications, this author asked their fellows, 'what shall we do to mark the 20th anniversary year?', especially after the latest Pixelache Helsinki 2021 Festival production. [5] The answers yielded in return connected with several ongoing processes that began to be posed, or raised as proposals, in 2019, anticipating these 'big numbers' years. They renew—arguably more traditional ideas of working with an association's memory—and re-vive, or indeed update, those who are present, involved contemporaneously, but were not more 3-4 years or 7-8 years before.

We sought to explore the how the association has developed, sustained or evolved it's festival practice, and what may remain. A particular aspect of the challenge of our reflective projects in 2022 was that most of the active association members were relatively new members (within the past 2-5 years of involvement), and few or none active from the so-called middle generation of active persons. However, two older-established active persons—Antti Ahonen as the only member who has been to all festivals, including the first in 2002, who is also our festival & association photographer holding a huge visual archive—and then myself, who first attended Pixelache festival in 2003, and first contributed to the festival programme from 2004 onward, attending all festivals since.

In this short presentation paper, I very briefly share the various approaches the association has taken during 2022, it's 20th anniversary year, which each highlight a different aspect of 'auto-archiving', and narrating past endeavors, with one exception when an outsider was invited to review and narrate. The overlap of artistic production and archiving as practices has been long acknowledged, however in overview, there are few examples of artistic communities archiving themselves. [6] I aim to contribute an example of grassroots community archiving [7], including artistic archiving strategies [8], and remind that small-scale and experimental cultural organizations may need to take--and lead—responsibility for their own archival processes, rather than wait until they are dis-associated, dispersed or no longer operational. That creative archival approaches can be a part of cultural programming. That stated, due to limited time for reflection or explanation, this paper is only the starting point

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of considerations in auto-archival processes appropriate for a cultural festival with a long history.

I acknowledge that this author is biased, and also subjectively partial in narrating the history of Pixelache, as the festival has meant many different things for 1000s of participants over two decades. I write here as one who has been involved in all the archival processes listed, with exception of the last two listed. It was because of this dominant role I have had in narrating the festival's past, since 2012 onward, that the exceptional non-involvement was explicitly commissioned to offer 'another story'.

20th Anniversary Archival Processes

Audiozines
Engaging with organizational meta-data, considering the production office as a tangible memory device, and producing two 'audiozines' proposed by member Irina Mutt, we gathered conversational perspectives from active members of period 2015-2021 reflecting upon how the organization has changed, with objects and anecdotes as prompts. The 'audiozines' were edited together and post-produced with Sumugan Sivanesan. The conversational aspects of the audio format don't explain everything, but it was hoped the spirit encouraged listeners to delve deeper into our archive webpages. Two exhibit installations were additionally made, one featuring photographs of process and objects engaged, while a second installation exhibited the actual referenced objects also in a small exhibition. [9]

Gatherings of Elders
The 'Gathering of Elders' format took place in December 2020 with intention of a physical gathering but eventually realized as a 5-hour zoom call bringing together local and international festival guests & organizers from the 'Kiasma Years' (2003-2010). A second iteration was organized by Antti Ahonen & Jenna Jauhiainen into a guided walking tour in May 2022 in Helsinki of old Pixelache festival venues from 2002, accompanied by A4 colour print-outs of people and events of that year. None of the venues remained as they were 20 years ago, although we gained access to one old club venue that was in-between iterations. Active festival contributors and producers from period 2002-20010 attended the walking tour, many who had not met for more than a decade, and ended up with pizza and drinks in a downtown bar. [10]

Symposium and VJ-remix Party
Organizing a 1-day symposium co-curated with 2 other newer members who are curators, Irina Mutt and Soko Hwang, we curated together a day of presentations and screenings which combined both founding persons of the festival, new locals who have never attended the festival before, mixing both contemporary topical cultural issues with nostalgic and reflective perspectives. We were very conscious of the need to make an event interesting to younger and newer audiences. However, towards the end of the day, it was only the 'old guard' who were left in the auditorium. However, the evening party produced by members Arlene Tucker, Mathilde Palenius, Antti Ahonen together with Jenna Jauhiainen. One specifically archival-performative aspect of the party was an interactive VJ interface which allow party goers, many of whom were former and current Pixelache associations members, plus friends, to joyfully live-remix visually the huge festival photography archive of Antti Ahonen. [11] [12]

Co-authored Histories & Herstories
Together with Juha Huuskonen, I was commissioned by Minna Tarkka, one of the 'MEHI' Finnish media art history anthology editors to write an article, summarizing 20 years of festival content & practices, highlighting emblematic art works. The festival was framed theoretically as an evolving community of practices. Juha Huuskonen, co-founder in 2002 and artistic director until 2011, plus myself involved from 2003-ongoing, combined our two authorial voices: the founder's & this author' perspective, respectively holding 10+ years and 18 years of involvements. It was a challenge to do so succinctly in a modest brief of 20,000 characters, and also represent a broad schema and range of activities. This article was written in English together, translated to Finnish, and will be published, to the authors' knowledge, first in Finnish, but according to the editor "contract with the publisher prohibits the publishing [of this article].. in any language before 2024". Hence, it will not be readable during either of the 20 year anniversary periods, neither 1st festival nor association founding, but of course after. [4] [13] Ideally, we can use this time delay in 2023-2024 to develop several more versions of this article is written with different pairings of older and newer active producers, to create missing herstories. We, or at least I am, are living in archives. [14]

Wikimedians-in-residence
This meta-archival processes was funded by Wikimedia Foundation rapid grant, to explore and reflect upon why Pixelache Festival's Wikipedia profile is 'stuck' with a profile made in 2005, updated a little in 2007, but largely left as a time capsule from more optimistic open knowledge, 'dot-org-boom' days. Initiated by Z. Blace, a Wikimedian-in-residence at Museum of Contemporary Art in Zagreb, and friend of Pixelache Helsinki scene since the early 2000s, Pixelache collaborated with 4 other Wikimedians—Florence Devouard, Rebecca O'Neill, Toni Sant, Nikki Zeuner, and Z. Blace—to record & release conversations about Wiki practices and cultural organizations. [15]

Rotating Co-directors
The issue of similar people narrating has been an interest in Pixelache, and trying to find ways out of it have been meta-archival interest since 2014. To recapitulate, with an awareness of irony in me writing this, often the author of Pixelache histories over the past 12 years, finding ways to hand-over is a bunch of processes. Note to reader: The association

has had no dedicated artistic director since co-founder Juha Huuskonen stepped away from the role in late 2011. Following several years of open camp-style participant-curating of the Festivals 2012-2014, from Festival 2015 onward, there have been rotating co-directors model for each festival since. This has meant that each festival led by different co-directors connect with new themes, venues, collaborators, partners and of course participants.

One of our newest members, Irina Mutt, auto-designated this year acting as co-director for Pixelache 2023 Festival together with Soko Hwang, made a 3-part podcast process called 'Oral Text', where-by they "invited an artist to situate their stories in a timeline; past, present or future. Each episode and each artist took a different format as well; interview, sonic picture-sound field recordings and a conversation". [16]

Another Story
Proposed by Egle Oddo near the beginning of their tenure as association chairperson 2019-2022, an international media arts curator, Kisito Assangni, was commissioned from outside Pixelache to write a new interpretative narrative of the festival, based on what can be found online, without dialogue with associations members, and especially not those who have been involved in shaping past narratives to offer 'Another Story'. This essay was published in November 2022 in a high-profile contemporary arts online journal, before other association members had the chance to read it: A bold surprise (!) to sincerely aim at re-contextualizing Pixelache with new references and within broader movements of media art archiving and art histories. [17]

Conclusion

At its best, Pixelache Festival is a community of hybrid & media art practices, fostering several generations of emerging practitioners and genres, inspired by an open, pragmatic and emerging culture over 20 years with various trans-disciplinary -mindsets. While not everyone has followed the same path, it may be argued that progressive and necessary changes in Finnish society and life have been regularly emerging at the festivals. For this reason Pixelache Festival is worth investing time in to archive and share with others what has been done over it's whole duration. Finding plurality of voice, a poly-vocal approach to narratives and stories about what has happened is important, as it reflects the many 1000s who have been involved.

The challenge for all of the described auto-archiving processes above was the longevity of the festival and the changing active members and production office workers has meant that various strategies had to be taken to engage not only the newer members, but also reach out to the older ones. In the last case, outsourcing the development a new narrative—another story—based upon what is found online

about our association, engaging with our Content Management System (CMS) designed in 2012, but not developed much regularly in the past decade, raised anxieties (at least in this author) of how to make accessible what we have done despite the 'link-rot' and CMS that happens to webpages after a decade or more. [18] Of course, that is a common problem and how most of the online-engaged audience see us as a festival or as an association. It may be objective, but it may just as well be partial, subjective and generated narrative based upon what remains, what is left behind, that which can be found or scrapped together at any given time. That is a dynamic reality of archives, that they are living entities. There is, however, an even harder angle to share more about associational engagement in archiving. It is one I have regularly discussed with my fellow Pixelache 'old-timer', and out of such conversation I wrote this in 2017:

Archiving is often seen as a dull aspect of cultural production. Life, events, festivals and performances go on whether they are archived or not, so there is always more to do. However, an important point of archiving is to question how we remember the passions, enthusiasms, associations and processes that we make for ourselves in the name of art, culture, activism, research. Hybrid practices are already difficult to describe. How can we archive them? How can we do the labour of sorting, selecting, renaming, meta-tagging, uploading, re-presenting and so on: tasks that can become deadly boring, tedious, and under the eternal threat of never being completed. After all, there is always the next upcoming thing.

I believe our approaches to the complexity and hard-to-describe quality of Pixelache over 20 years—at the time of our double decade anniversary years—give rich creative example of self-organized auto-archival strategies for other cultural associations and festivals.

Oi! Did I forget to mention that Antti Ahonen & Jenna Jauhiainen arranged for a Pixelache time-capsule to be made before the end of last year? Apparently they put some things from our production office—leaflets, flyers, DVDs, badges, T-shirts hopefully—actually I don't know what is inside. It is a fawn leather bag, early 90s style, and it is cling-film wrapped up, and currently sits on top of our shelves, above the archive boxes. Let's hope someone finds it in a cellar in 10 to 20 years time.

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Sustainable digital preservation of new media art

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Abstract

This paper is about two pilot studies conducted in 2022 that aimed to develop a model for preserving and archiving new media art work in the context of a research project on the sustainable digital preservation of new media art that is being co-hosted by the Museum of Modern Art in Ljubljana. As the works of art selected for the study by Slovenian new media art pioneers Vuk Ćosić (2000) and Srečo Dragan (2005) were technically obsolete or non-functional by the time of the study, the question of how to bring the artworks back into existence and what components of each artwork to include in the collection and preservation process constituted one aspect of our research. But this process of reconstruction also raised questions about how the preservation of media art is reshaping the practice of archiving within an institution whose holdings were, until recently, largely in traditional mediums. An interdisciplinary approach addressed the problem from different points of view, involving the practitioners, experts from art-history, museology, computer science, media theory and intellectual property rights.

Keywords

new media art preservation, digital cultural heritage, reconstruction, new media art archives, media art documentation, inter-media translation, new media art pioneers

Archiving the Unarchiveable: Institutionalizing Media Art History in Slovenia

Slovenia has seen the rise of artists working in new, emerging and augmented media who regularly exhibit their work at international art festivals and exhibitions since the 1980s. Much of this media art has been produced by independent and grassroots communities that lack the material backing for archiving, placing this history at risk. The museum has been co-hosting this project in order to address this lack through state-funded and institutional resources. But in undertaking the re-exhibition of two works of new media art in the museum's holdings, the project has treated these restoration projects as opportunities to identify the necessary infrastructural investments that would enable longterm institutional support of this relatively recent development in Slovenian art history. The need to rethink the processes and practices associated with archiving art objects at the time of acquisition has been one of the pressing preliminary conclusions of the research project. Had the artists not been available to describe the conceptual motivations driving their projects, the curators would have had to work from

exclusively photographic documentation, one of the main archival methods used by the museum so far, but also one that associates the specificities of the new media art object with its appearance rather than its operations and internal technical affordances. In order to view these artifacts as social, cultural, and discursive interventions rather than inanimate and inert objects, new methods will have to be developed to document the relations between the artwork and its original media context and environment. [1] Examples of such documentation, including interviews, questionnaires, exhibition history and technical specifications, will need to be conceptualized and adopted as a means of ensuring the accessibility of new media art history and its integration within narratives of modern and contemporary Slovenian art. An important feature of both projects is the fact that the artists are still active and chose to reconstruct their older work in the contemporary socio-historical and technological context.
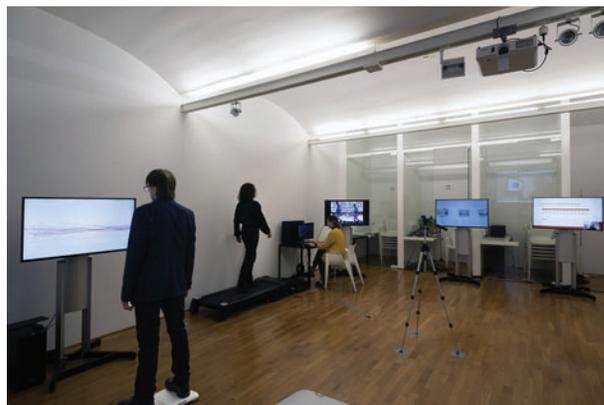
Figure 1. *Matrix Coincidence Dating Club* (2005, 2023) by Srečo Dragan at the Museum of Contemporary Art Metelkova, 19 Jan. 2023. Photo: Dejan Habicht.

Reconstructing a techno performance: *Matrix – Coincidence – Dating Club 2005* by Srečo Dragan

New media artworks by the Slovenian artist Srečo Dragan were originally developed in collaboration with research laboratories and used cutting edge programs. [2] Fifteen years later, these technologies have become obsolete, i. e. they were never implemented outside the research labs. A digital communities installation that used text messages on mobile phones and included a techno performance based on gait recognition from 2006 was recreated using contemporary computer vision algorithms based in neural networks. [3] Since this was the core of the artwork, our group also documented the artistic concept behind all the elements of the project.

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For instance, a digital animation was produced as an informative visualization of the project in addition to the written text, photo and video documentation of the original techno performance.

Figure 2. *0Ä "&'1%- .!** (2000, 2022) exhibition by Vuk Ćosić at the Museum of Contemporary Art Metelkova, 13 Oct. 2022 - 8 Feb. 2023. Photo: Dejan Habicht.

Reconstructing a web-based textual generator/visualizer after 22 years: the *Nation – Culture* by Vuk Ćosić

The *0Ä "&'1%.- .!** project that net.art pioneer Vuk Ćosić created in 2000 was based on a then-widely used internet portal in Slovenia, the "Mat'Kurja" directory, and it used a Macromedia Flash platform. [4] Twenty-two years later, there are several dilemmas about how to address the project that sourced its textual stream from a now long-gone search engine (in fact a Yahoo-type directory), but more importantly how to substitute it without losing the layers of cultural meaning that originally related the internet context to the artistic context and to the technologically generated text. The process was documented and archived on the conceptual and technical level with the author being asked to advise on the process of reinterpreting the original artwork. [5] But his idea of bridging 22 years of technological development by migrating a work originally conceived for a digital-born Slovenian text generator to Twitter suggests the extent that the creative act needs to be repeated with restoration, and hence how challenging such work is to archive. [6] Also, this particular project points to the implied necessity for this project to include cutting-edge technological development that in both cases is tied to the Slovenian-language context.

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Eszter Polonyi is an Assistant Professor in Cultural History at the University of Nova Gorica in Slovenia and an ACROSS Visiting Lecturer in Media Archaeology at the University of Udine. Her research focuses on operational images emerging at the intersection of twentieth-century film, photography, art and science from regions that are geopolitically peripheral to Europe and North America. She is also working on a book manuscript entitled An Archaeology of Recognition Media and is PI of a research project on Identity Photography that is also funded by the Slovenian National Research Agency.

Aleš Vaupotič is a new media artist and theorist. Since 2021 he is the director of the Museum of Modern Art in Ljubljana (Moderna galerija), before he was the dean of the School of Humanities of the University of Nova Gorica. In 2022 he was the commissioner for the Slovenian Pavilion at La biennale di Venezia. He is the project leader in a nationally funded interdisciplinary project, Sustainable Digital Preservation of the Slovenian New Media Art. Among his research focusses are the theory of discourse, semiotics, comparative art studies, methodology of digital humanities.

Jaka Železnikar works in the Museum of Modern Art (Moderna galerija) as an expert in the field of digitalisation, sustainable archiving, safeguarding, displaying and restoration of digital art works. He is also an independent author in the field of net.art and electronic literature, since 1996. Many of his works are now technically obsolete for a number of reasons. His experience with restoration of digital art works ranges from his own work to contributions in restoration of works by other authors.

Connected archives. New archive interfaces from queer and open-source strategies

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Abstract

The three connected archives that we presented - ***ArchID, Gendernaut*** and ***Argonaut*** - remind us of the importance of imagining the archives that reflect on identity, gender and sexuality, as live interactive spaces, free of heteropatriarchal codes, inhabited by bodies and multiple subjectivities that relate the past, present and future.

Keywords

Art, archive, body, identity, queer, self-representation, methodologies, new media, open-source

Text

ArchID is a Digital Identity Archive about artworks based on self-representation, body and identity. [1] A documentation space with texts and interviews on the creative and non-face diffusion strategies of artists, curators and critics with significant careers in the contemporary art scene, an Online diffusion space for the work of iberoamerican artists who work on the self-representation of the individual. This artistic research project on the new processes of creation and diffusion of identity artistic practices in non-presence, is part of the research interuniversity project *Connected bodies II. New processes of creation and diffusion of non-face-to-face identity artistic practices*.

Given the growing appearance of archives involved in the recovery of memory about new media from an artistic perspective, we see the need to create free, open source tools that allow visualizing the complexity of historical analysis. In order to question the power relations intrinsic to the very structure of the archive and propose new ways of visualizing narratives based on the concept of genealogies, we have designed a "software" making use of queer methodologies.

Gendernaut *Queering the software* is the name of this artistic and political project where we have designed and programmed an open source program that allows the collective creation of archives through a multimedia and interactive online experience, a tool that could be a relevant methodological contribution for researchers who come from the humanities to the social sciences. [2] The platform chosen to develop the software is WordPress, an open source content manager. And the way has been a plugin, which integrates with existing themes and allows you to create a content archive with 3 different display options: matrix, timeline and list. It also allows administrators and

Figure 1. ArchID. Archive and artistic research project on self-representation, the body and identity construction . ©Cuerpos conectados.

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web users to create collections of content and edit them later.

In a second phase, we are immersed in the design and programming of a new interface that we call **Argonaut** through the development of a Wordpress theme. We are developing open source software that allows viewing these stories from different forms of viewing, interaction and accessibility: database, interface design, content tab, intelligent search, creation of genealogies, timeline, etc. It is about making an archive environment accessible through new technologies and studying how to adjust the functional and interaction requirements that guarantee autonomous and comfortable use by everyone.

Argonaut, which through the design of different templates and integrated with the *Gendernaut* plugin, will allow users to create a more complete archive viewing environment that will enhance the display of interactive narratives. It addresses the study of potential users when designing a display system. They are the ones who will use the system and that is why it is essential to know their needs and find the best way for them to use and take advantage of the system. It is essential to know their cognitive abilities, as well as the constraints that impact the management and use of information. User-oriented design insists on gaining a closer understanding of people's characteristics, interests, and capabilities, and uses various methodologies to achieve this. The adaptive design must flow with a constant adaptation of the size of the graphics and the structures that make up the interface in the different devices in which it is displayed. In this way, he explore new connections between the virtual device and the human.

Our work now presents as a novelty the analysis of a currently burning scenario: the condition of non-presence in the creation and diffusion processes that, at the current time of pandemic and with greater assiduity in the coming years, will experience this type of artistic productions. This archive will address the technological advances that have had to be implemented in an accelerated way during confinement and that represent a logical evolution of other cultural praxis or ways of doing, such as the occupation of non-presential space, or creating works in everyday settings.

We try to investigate the orientation and resolution of the new modes of online creation and sharing that have been activated during the pandemic to allow us to glimpse future options in the dissemination of art and, at the same time, to be a benchmark for pioneering research for the future. on media archaeology. [3] We will do it through an online research platform on Art, Connection and Identity, designed to encourage reflection and debate around these creation and dissemination processes. [4]

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Acknowledgements

Authors Biographies

Laura Baigorri: Professor in Media Art. Faculty of Fine Arts of the University of Barcelona. Director of the Department of Design and Image and Vice Dean of Research, Masters and Doctorate (2016-2021). She combines her teaching and research experience with criticism and curation. She has organized seminars and exhibitions on art and new media. Main exhibitions: *Multiverso* (2016-2019) BBVA Foundation Madrid; CTRL+[SELF]: Intimacy, Extimacy and Control in the Age of the Self's Overexposure (2016), Studio XX Montreal, and *Videoarde. Critical video in Latin America and the Caribbean* (AECID Instituto Cervantes). She has published articles on art and activism, video and game art, and the books: *Cuerpos conectados. Arte, identidad y autorepresentación en la sociedad transmedia* (Dykinson, 2021), *Video in Latin America: A critical history* (AECID & Brumaria, 2008); *Net.art: Aesthetic and political practices on the Web*, (UB & Brumaria, 2006) and *Video. First stage: The video in the social and artistic context of the 60s/70s* (Brumaria, 2004).

Diego Marchante: Transfeminist activist, transmedia artist and Lecturer. Doctor of Fine Arts from the University of Barcelona, since 2008 he works as a professor of Audiovisuals and Gender Studies at the Faculty of Fine Arts of the University of Barcelona. In 2011, he published "Archivo T. A transfeminist and queer archive" (http://archivo-t.net), of social movements and artistic practices that have addressed gender issues in the Spanish context from a queer and transfeminist perspective. In 2020-21 his project "Gendernaut. Queering the 90's" (http://gendernaut.net) has been selected in the call for research stays at the Museo Nacional Centro de Arte Reina Sofía of Madrid, in the context of the project "Our Many Europes. Europe's critical 90s and The Constituent Museum", beneficiary of the Educational, Audiovisual and Culture Executive Agency of the European Union, organized by the network of European museums L'Internationale. His artwork has been exhibited at Caixaforum, CCCB, MACBA and MNCARS.

PAM (Plataforma Arte y Medios) - Archiving and Disseminating Media Arts from Latin America

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Abstract

In the context of the *Archive Presentations* section we would like to introduce PAM - Plataforma Arte y Medios [Art & Media Platform] an independent project which has been active since 2016. PAM was born as an answer to the challenge of researching, documenting and visibilizing contemporary media arts projects and practices developed in Latin America, while generating a theoretical and historical context for present and future interpretations.

Keywords

AST, Histories of Art & Technology, Documentation, Archive, Latin America

Introduction

In their research on media arts preservation and social memory, Jon Ippolito and Richard Rinehart stated that the underdevelopment of strategies and methods for preserving and documenting media arts -and the subsequent difficulties for accessing the artworks- turn them invisible for educational purposes and for history [1].

Ippolito and Rinehart's assessment can also be read in the opposite (and complementary) direction: those artworks that are not legitimated by curators, critics, collectors, educators and historians find a more complex path to obtain resources for their maintenance and get interest in their care. The latter is the case of a great amount of artworks that cross borders with sciences, technology and other fields of knowledge, and particularly of those that were born in some geopolitical regions, like Latin America.

Archiving the Resistance

Artists working in the AST field allow us to compare them with such specimens that are left out of traditional taxonomies, as it was the case of the platypus for a long time. The characteristics of art practitioners that work with technologies and scientific inputs tend to disconcert the artistic field. Their productions fall out of place of traditional taxonomies, which together with other material and historical causes, constitutes one of the main reasons why documenting and preserving AST tend to be a complex task.

Back to the aforementioned comparison, it is worthy to remember that the first time Europeans saw a platypus (1789) they thought it was a sophisticated joke of a taxidermist. The platypus is a curious animal. It has a peak like a duck, a tail similar to beaver's, a body that reassembles an otter; it is a semi-aquatic mammal, but it lays eggs. Its skin has bioluminescent properties, it is shy, playful and smiling, but poisonous and it has more than 40,000 electroreceptors that allow the detection of its prey. To sum up, it is an animal that avoided for a long time to be clearly classified. Probably, media artists provoke this kind of perplexity in the public, critics, institutions, but also in researchers and archivists.

PAM seeks for the documentation and dissemination of the diverse artistic manifestations of the platypus, assuming the task to address them in their plurality and discrepancy. Also taking the challenge to maintain this productions in their dispersion [2] avoiding to force them to fit in previous categories that are alien to them. While doing so, PAM also pays special attention to the overlooked role that Latin American played in media history. Applying a variantological gaze, PAM looks at the unseen events that in a silent way helped to develop the current media arts creative scene [3].

PAM has not set fixed borders and limits, but it has very clear goals and aims. Probably the whole platform is better described as an anarchival strategy [4]: a critical approach to archiving, history and memory through different textual and material tactics.

PAM Futures

It is not easy to sustain a project like PAM. The same fate of many Latin American arts is the one that waits the projects designed to preserve them. PAM will live if it is appropriated by artists and researchers, if its content can reborn in new histories, projects and creative productions. Introducing the platform in the context of the *New Media Art Archiving Summit* is a way to open and extend its dialogue to unexpected possibilities.

Acknowledgements

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Authors Biographies

Valentina Montero works as curator, educator and researcher. Lives in Valparaiso, Chile. PhD in Advanced Artistic Production (University of Barcelona, 2015). Her research, texts and exhibitions address the uses and appropriations of technologies and sciences in creative practices from a critical perspective. Currently is Associate Professor at Finis Terrae University; director in the Master in Image Research-Creation at the same university, and professor in the Master of Media arts of the University of Chile. She is director of PAM / Plataforma Arte y Medios and ANID /Fondecyt researcher.

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Vanina Hofman is a Lecturer at the History and Art History Department of the Universitat Rovira i Virgili (Catalonia) where she is also Director of the Unit *Aula de Cine*. She develops her work in the field of intersection between arts, sciences, technologies and societies, in a hybrid territory among academic research and cultural production. She is particularly interested in the processes involved in the construction of memory in digital culture, the archiving of media arts, the unconventional arts histories and the digital materialities. She has recently published the book "Divergent Practices of Media Arts Preservation. Remembering and Forgetting in the Digital Culture" (Prometeo Libros, 2019) based on previous fieldwork conducted in Argentina. She is collaborating with PAM / Plataforma Arte y Medios.

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Toshio Iwai Archive and Research

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Abstract

Toshio Iwai, who has been internationally acclaimed as a leading Japanese new media artist since the mid-1980s, and Hiroko Kimura-Myokam launched the "Toshio Iwai Archive & Research" project in 2021. This project aims for digitizing and for organizing archival materials which has been stored by artist himself. Due to non-public papers, it is difficult to access to them and research has not progressed.

Although in recent years Iwai has been known as an old media artist; a picture book artist, until the early 2000s, he was an artist in the not only field of new media art, but also in a variety of other "new media" industries including video games, virtual sets for television programs in the early 1990s, and the electronic musical instrument "TENORI-ON" (2007, Yamaha). While his various achievements have had a high impact on the next generation, there are currently few opportunities to see his past works. In addition, A comprehensive evaluation of his work has not been conducted due to the interdisciplinary knowledge required to contextualize and understand his broad range of activities.

Usually, what is required of an archivist is to be as objective as possible and to organize the materials for any future reevaluation. In this project, however, the artist himself is engaged in organizing the materials, and Kimura-Myokam is rather seeking ways to push Iwai's subjective viewpoint as an archivist.

Keywords

Individual Artists & Archiving, Personal Papers, Media Art, Digital Archive, Video Game

Introduction

The research report of the DOCAM project (2004-2009) by the Daniel Langlois Foundation have been referred for re-creation and restoration of many technology/time-based artworks. One of the results of this project is the model of "authenticity" and "integrity"[1] in such art works, to which the concept of "originality" with its strong connotation of uniqueness is difficult to apply.

Iwai's representative work, *Piano - as image media* (1995), had been displayed with a significant loss of authenticities (Function, Concept, Material's significance, Work's behavior, Viewer's experience, Aesthetic) due to the incomplete inheritance of the work's integrity (Original Materials and Historical Inscriptions) incompletely (see Fig.2). This case exposed how a work could be transformed in the future in the absence of the artist and sufficient related archival materials.
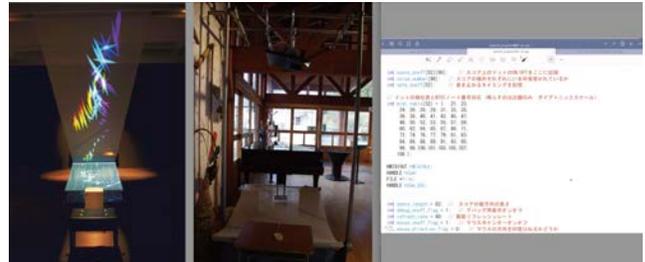
Fig.1 Exhibition view in galerie deux in 1998, Courtesy of Toshio Iwai.
Fig.2 The work being exhibited in Sasayama Children's Museum. Photographed in 2010. Courtesy of Sasayama Children's Museum.
Fig.3 Programming Code by Iwai. He analyzed his original code and added comments for future generations of programmers.

Twenty-seven years later, in 2022, Iwai re-produced it. In the re-creation, he rewrote the program so that it could be exhibited with one computer and one projector, although it had been required two computers with different programming languages and characteristics (SGI and Amiga) and two projectors. The entire installation process was filmed with pin microphones on the artist and installer.

Thus, from the standpoint that it is impossible to create a work that will last forever, this project aims to organize archives that do not compromise the authenticity and integrity of the work by placing importance on the artist's subjectivity. Toward this end, not only organizing objective information from such as ephemera, catalogs, and tech riders, Toshio Iwai himself continues to scoop out the elements that iden-tify variable works from archival materials and their core as works.

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Author Biography

Hiroko Kimura-Myokam is a curator and a researcher. She specializes in the archiving and conservation of new media art. She holds a MA in MediaArtHistories from Danube University. Lecturer at the Kanazawa College of Art and the Kyoto Seika University.

Curatorial researcher for SIAF (Sapporo International Art Festival) Lab 2022-2024.

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Ars Electronica Archive – current developments and plans

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Abstract

The Ars Electronica Archive contains documentation content since the start of Ars Electronica in 1979. A huge amount of artists and researchers from the field of art, technology and society were part of Ars Electronica activities during more than 40 years. Part of the archive is accessible online (Online Archive), part of it only internally (physical Archive & Internal Database).

The presentation provides a glimpse into the current developments and plans of the Archive.

Keywords

online archive, media art, festival, websites, search, software

Ars Electronica Archive

The Ars Electronica Archives mission is to preserve the ideas and the diversity of Ars Electronica, based in Linz, Austria, and to make as much of it as possible freely accessible to users. It´s holdings include a diverse array of art works and documentation of projects, exhibitions and activities from the Ars Electronica context and across the entire spectrum of media art throughout the world. Highlights are the winning projects of Prix Ars Electronica in the Prix Online Archive, and video documentation of the early Festival years and Center exhibitions, which was possible through the involvement of the ORF – Austrian Broadcasting Company's Upper Austria Regional Studio at that time [1].

Part of the Ars Electronica Archive is accessible online (Online Archive, https://ars.electronica.art/archive/en/, https://archive.aec.at/), part of it only internally (physical Archive & internal Database).

The latest achievements were among others the re-accessibility and preservation of previous web pages (Figure 1), and the implementation of a search function across all areas in our Online Archive, which was due to different sources more complicated that it seems in the first view.

The tasks for the next years are challenging as well. This year this will be the start of the update of our database structure. Starting with the intern database, we have mainly two goals in Mind:

First, and most important, to make research and adapt to current standards and best practice examples in the archive world regarding data handling. This will be the groundwork for further continuity and long-term preservation, for new connection possibilities (with other archives for example) and better export and import possibilities.

The second main goal – highly important for the intern workflows - is, to use this update to also adapt and improve the user interface regarding new requirements. This basically means, to simplify it, to make it easier manageable and therefore more interesting for Ars Electronica employees outside of the Archive Context.

Figure 1. Ars Electronica Website Archive, https://ars.electronica.art/archive/en/web/ . ©Ars Electronica

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[1] Martina Hechenberger, Theresa Schubert Minski, "The Ars Electronica Archive", in: *The Big Picture – New Concepts for a New World*, (Hatje Cantz, 2012), S. 388.

Author(s) Biography(ies)

Christina Radner (AT) currently is the responsible project manager for the Ars Electronica Archive in Linz, Austria. In 2009 she got her master´s degree in art history at the University of Vienna. At an internship at the Art Brut Museum Gugging in Klosterneuburg near Vienna, she got a first insight into the archive work of a museum. She was hired project-based, to help work on an artist´s estate and to prepare a retrospective and a comprehensive catalogue of works. In 2013 she moved back to Upper Austria and started her work in the Ars Electronica Archive Team. Since 2015 she is the responsible project manager for the Archive and part of the Festival/Prix/Archive Core Team of Ars Electronica.

The ZKM | Center for Art and Media Karlsruhe Archives

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Abstract

The ZKM | Center for Art and Media Karlsruhe was founded in 1989 to provide artists with access to the latest technologies as well as a public space where exhibitions, events, and publications would allow the public to explore and discuss the potential impact of technological change on art and society.

As part of a comprehensive restructuring of ZKM, the Department Wissen (Knowledge) was founded in 2017 comprising the collection, the archives, ZKM's public library, as well as the Laboratory for Antique Video Systems and the digital art restoration team. The archives thus include not only the history of the institution and archives of pioneers of media art, but also the constantly expanding archives documenting the restoration of the collection's media artworks.

The paper gives an overview of the structure and contents of the archives, as well as the potential advantages of the department's specific structure combining the expertise of collection, archives, library and restoration.

Keywords

media art archives ; media art collection ; digital art preservation ; video art preservation ; media art preservation ; library ; wiki ; museology.

Introduction

The ZKM | Center for Art and Media Karlsruhe was founded in 1989 with the aim of providing support for artists exploring the latest technologies and creating a space for the public through exhibitions, events and publications to explore and discuss the potential impact of technology on art and society. The ZKM's mission has also included collecting works of contemporary art, especially media art, from the very beginning.

After about 25 years of existence, new demands became apparent: The separation of artworks depending on the medium used and the associated division of the collection into three departments – Museum of Contemporary Art, Media Museum and Media Library – had for some time contradicted the practice of contemporary artists. Moreover, a need emerged to preserve not only artworks but also archives of media art and make them accessible to the public and the scientific community. Although archives had already been taken over since the institution's creation, an appropriate institutional structure for them was lacking.

A New Structure for Media Art Archives

The ZKM therefore decided on a comprehensive reorganization. As part of the restructuring, the Department Wissen (Knowledge) was founded in 2017. It comprises the collection – with artworks of all media –, the archive, the digital art restoration team, the Laboratory for Antiquated Video Systems, and the ZKM public library. Combining these areas of work in one department – which is not common in museums – was a conscious decision to be able to meet the special requirements of media art archives.

The ZKM archive has two parts: the archive on the history of the ZKM and archives of artists and theorists related to media art and its precursors. The institutional archive contains documents and audio-visual media on artistic productions, research projects, exhibitions, events, and publications since 1989, while the archive of artists and theorists includes about 150 estates. A special focus here is the history of digital arts, video art, experimental poetry, sound art and electronic music. The extensive holdings of videotapes – over 27,000 tapes of artworks, interviews, and documentaries since the 1960s – were acquired for the archive mostly through the work of the Laboratory for Antiquated Video Systems, which has been rescuing historic videotapes since 2004. Of similar importance for the archives is the expertise and support of the digital art conservators.

Furthermore, the ZKM archives also include the documentation of all media art restoration processes. In 2019, a wiki was set up to document the software-based art collection. In addition ZKM has gathered a collection of historical software and of instruction manuals, thus creating an important resource for conservators and researchers.

The Department's unique structure has proven effective in addressing the unique challenges of media art archives.

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Authors Biographies

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Hartmut Jörg, Audiovisual Archives and Collection, ZKM

Felix Mittelberger, Archivist, ZKM

Dorcas Müller, Head of the Laboratory of Antique Video Systems, ZKM

Margit Rosen, Head of the Department Wissen, ZKM

Morgan Stricot, Media and Digital Art Conservator, ZKM

Matthieu Vlaminck, Media and Digital Art Conservator, ZKM

FILE ARCHIVE

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Abstract

Presentation of the FILE ARCHIVE, a digital archive of FILE - Electronic Language International Festival. FILE ARCHIVE is an initiative carried out by the independent cultural non-profit organization FILE – International Electronic Language Festival – and aims to make available and share its collection, which brings together 23 years of achievements, in an accessible and free online environment. This expanding collection makes available the last 9 years of FILE FESTIVAL events and exhibitions (2014 -2022), through the free software TAINACAN.

Keywords

digital file; digital memory; cultural memory, digital platform, database, digital repository.

Co-founded by Paula Perissinotto and Ricardo Barreto, FILE - International Electronic Language Festival - has become a Brazilian cultural platform, with international visibility, that stimulates aesthetic and scientific manifestations produced in electronic and digital art. Since 2000, the organization has maintained a vast collection of documents and records of projects applied in open calls. The content gathered in these 23 years, has become a relevant source of data, in order to understand the transformations (past and present) in the fields of aesthetics and technology. Throughout its history, FILE has constituted a unique collection of its kind, having held 51 exhibitions and exhibited more than 9,000 national and international works. The Festival also visited 6 Brazilian states and exhibited artists from 48 countries.

FILE ARCHIVE is an initiative carried out by FILE, and aims to make available and share its collection, which brings together 23 years of achievements, in an accessible and free online environment. FILE ARCHIVE proposes to be a repository of ideas and media that were creatively explored by the vanguards of electronic art, in their respective eras, and continues to foster new practices of electronic artistic production, such as installations, performances, videoart, sound art, animations, games, webart, bioart, NFTs, algorithmic art, etc. The archive content is a narrative of the artists' participation from more than 48 countries.

This constantly expanding collection is available through the free software TAINACAN, developed at the Faculty of Information Science at the University of Brasília. FILE ARCHIVE, currently, have inputted the data of the last 9 years of FILE exhibitions (2014 -2022); including files in different formats, such as digitized publications, biographies, synopses, photographic records of exhibitions and works, as well as information about symposia, workshops, artistic performances, and festival awards; as illustrated in Figure 1, Figure 2, Figure 3 and Figure 4.

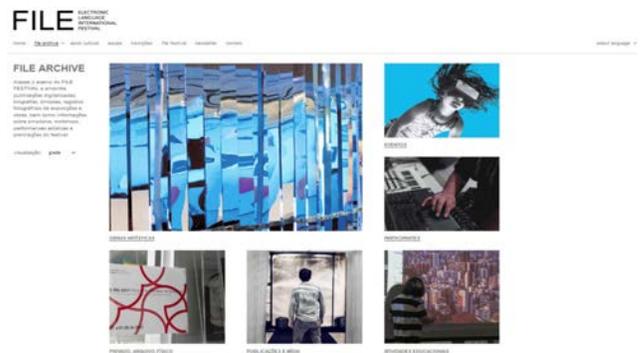Figure 1. FILE ARCHIVE homepage. © Copyright. FILE FESTIVAL

Figure 2. Collections of FILE ARCHIVE. © Copyright. FILE FESTIVAL

The final structure of FILE ARCHIVE digital repository was composed of 8 collections, where each of them contains specific metadata of different typologies, such as: Artworks, Participants, Events, Educational Activities, Venues, Publications & Media, Physical Archive, Registration form.
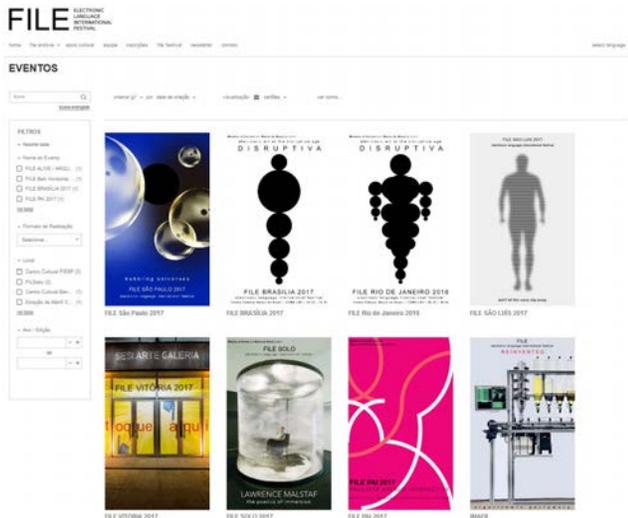

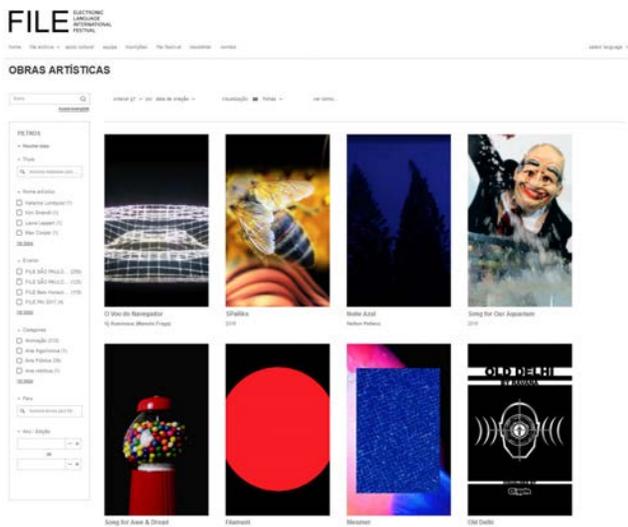Figure 3. FILE ARCHIVE, Events Collection. © Copyright. FILE FESTIVAL

Figure 4. FILE ARCHIVE, Artworks Collection. © Copyright. FILE FESTIVAL

The result of this project offers the public interested in the field of art and technology online access to organized information and contributes to facilitating, to all interested scholars, the means for free access to the information in this collection. In this way, we support, value and disseminate the festival's content, in addition to preserving the material and immaterial assets of the international and historical cultural heritage created by a Brazilian initiative.

Author(s) Biography(ies)

Paula Perissinotto is specialized in new media, contemporary art and digital culture. Master's degree in visual poetics from ECA (School of Communications and Arts at USP University of São Paulo). Since 2000 I have been working as Co- organizer and Co-curator of FILE, Electronic Language International Festival, a non-profit cultural organization that promotes and encourages aesthetic and cultural productions related to the new poetics of contemporary culture. At the festival, is responsible for the selection of works, international relations and also calls for project management carried out in Brazil. Have produced and realized 50 art and technology exhibitions. Current is a PHD student at the University of São Paulo, School of Communications and Arts | ECA, in Visual Poetics. Member of the Realidates Research Group licensed by CNPq, led by Profa. Dr. Silvia Laurentiz who in turn, is formally affiliated with the School of Communications and Arts and the Department of Visual Arts, ECA / USP.

Fabiana Krepel is a Food Engineer graduated from Unicamp University, and post-graduated in marketing from ESPM. She holds a Graphic Design Certificate from Parsons The New School of Design and an ADVANCED DIPLOMA in Online Education & Training from the Institute of Education, University of London.
Fabiana has experience in strategic planning, direct marketing, acquired in multinational and national companies such as WUNDERMAN. She has also 15 years of experience in specialized consultancy for cultural projects in incentive laws; both in the development and approval of customized projects, as well as in the management of sponsorship resources and accountability.
Since 2001 she has been a Partner – Director of KCE Consultoria Empresarial | b.k design; and is responsible for coordinating the FILE FESTIVAL platforms; FILE ALIVE and FILE ARCHIVE (online educational platform and archive Platform); as well as responsible for FILE cultural projects in incentive laws.

-Panels-

Art Data: New Frontiers in Curating, Preserving, Displaying and Connecting Digital Based Arts

Panelists: Anna Frants, Janine Randerson, Alexandra Dementieva

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Abstract

Archiving media and digital art pose non-trivial challenges to everyone involved in the art process. Operating and cooperating on different continents, Anna Frants, Janine Randerson, Alexandra Dementieva, and Natalia Kolodzei will share their experiences with archiving and documenting new media while searching for a sustainable global platform for archiving processes and ways of collaboration among transnational institutions.

Panelists will discuss how the artist, the curator, and the institution that organizes digital art exhibitions and events reason at each stage of the archival process: from the artist's conception to the recording in the conditional archive card, to contemplating on the ways of preserving the digital art heritage.

The possibilities of a unified digital art archive, such as the Connecting Archives project, are significant. Addressing the interoperability of analog archives, and reconsidering and bridging binaries regarding the global 'centers' of new media art practice versus the so-called 'periphery' are other essential issues to be discussed. It is also important to focus on users' expectations from such an archive and how to improve the experience of such an archive on both sides - authors and users.

The panel discussion is focused on the speakers' exchange of knowledge and practical experience, each of whom looks at the problem of preserving and presenting digital-based art from her special perspective. Ultimately, the panelists will outline points of contact by which the easiest and most comfortable path to preservation and representation can be established for all interested parties.

Keywords

Archive, new media art, digital-based arts, panel, Connecting Archives project, world-wide network

Panelists' abstracts

Janine Randerson. Distance and Proximity: Aotearoa Digital Art Network and the Lye Foundation Archive
This presentation explores a specific archive of new media art in Aotearoa New Zealand; the Aotearoa Digital Art Network (ADA) which started with an email list in 2003, as a case study of a living network and archive with a recently remodelled website. This archive holds potential for deeper relationships to other international media art archives and networks. The Archive of Digital Art (ADA, established 1999, currently based in Austria), shares the same acronym, but we also share similar proclivities and desires to foster networks of artists across time and geographic distance. The Aotearoa Digital Art Network (ADA) builds also on a proximate community, tending to the Indigenous culture and ethos building from our Moana-Nui-A-Kiwa, Southern Pacific geographic region. Although the ADA network was born on the internet, many media artists in Aotearoa locate an ancestor in Len Lye (1901-1980), an interdisciplinary and free-thinking artist, known for his experimental films and kinetic sculpture, which draw on both electronically programmed and naturally occurring energies. I will touch on Lye's historical media art works, including unrealised propositions for programmed sculpture and analogue tape files held at the Len Lye Foundation archive in Taranaki, New Plymouth in Aotearoa. Locally-tended archives such as these exist worldwide, and continue to offer portals to reconnect emergent digital practitioners with the early experiments with emergent media. As a founding trustee of ADA Aotearoa Digital Art network, I have observed that new media art archiving practices at first reinforced binaries regarding the global 'centres' of new media art practice versus the so-called 'periphery', or global 'South', underscoring the timeliness of the recent efforts to bridge these divides.

Anna Frants. CYLAND Media Art Lab: Archiving experience
This presentation reveals our experience with archiving at CYLAND's Media Art Lab. Understanding the importance of preserving digital art and documenting its evolution, we assemble our own archive, which can be divided into three self-contained units.

CYLAND Media Art Lab has been working with sound for many years, both independently and as part of artworks of various genres. In the first ten years of its existence, CYLAND Media Lab gained a lot of experience presenting sound at exhibitions, from media players,

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directional sound sources, lounges for listening, and other, more "tangible" works of contemporary art. As a result of the explorations, CYLAND came to the most natural medium for archivation, showing and spreading the sounds — lathe cut records. This led to the CYLAND Audio Archive (CAA) creation in 2013, curated by Sergey Komarov.

The CYLAND Video Archive, curated by Victoria Ilyushkina, has been functioning since 2008. One of the tasks of the archive is to form an open and accessible collection, to protect works of art from being closed in private collections, and to prevent them from becoming obsolete. From the very beginning, CYLAND Video Archive was conceived as a platform for networking and interaction between artists, curators and art institutions that promotes the development of media art and allows a wider audience to follow new trends in digital visual art.

The Made in CYLAND archive consists of works by CYLAND's regular participants, which reflect the laboratory's main goal: creating works incorporating new technologies and experiments in media art, in a creative collaboration between artists and engineers. Here we document all the works, similar to what was proposed by Byeongwon Ha for interactive art - from the idea and technical details with schemes, codes and illustrations to the list of places where the project was exhibited.

Alexandra Dementieva. Different ways of archiving digital works of art

Archiving digital artworks is a complex and ongoing process, as digital technology and file formats constantly evolve. Some general steps that can help in it: create multiple backups, keep track of file formats, consider metadata standards and long-term preservation, and document the artwork.

Conserving digital art without institutional help can be challenging as an individual new media artist.

Some artists elaborated a system for archiving their digital media; for example, Golan Levin created a custom-built server that stores his artworks and metadata and regularly migrates his files to new formats to ensure they remain accessible; Cory Arcangel created a tool called "Preservation Toolkit" that allows artists to preserve their digital artworks. The toolkit includes software and hardware guides and information on best practices for digital preservation.

Another tricky thing in archiving and preserving digital art is author rights. As with any art form, the artist generally holds the copyright to their work, and this ownership can extend to digital art.

However, digital art can depend on specific code languages and technologies, which can evolve and change over time. This can make it difficult to ensure the work remains accessible and functional in the future.

If a digital work is created in a specific video format and later that format is upgraded to a higher quality or different compression, it may require changes to the original work to be compatible with the new format. This can involve re-encoding the original file, potentially affecting the video's quality or other aspects of the work. In some cases, it may be possible to preserve the original work and create a new version that is compatible with the upgraded format, but this can also depend on the specific software and tools used to create the work. Additionally, it's worth noting that changes to video format or compression can also affect how the work is displayed or experienced by viewers, so it's important for artists and archivists to consider these factors when preserving digital art carefully.

I created my own protocol conserving my work: to make multiple copies of work, record detailed documentation, to keep up with technology, etc. And finally, I made a paper version artists book of every work with detailed information, photos and code.

Authors Biographies

Alexandra Dementieva
Alexandra Dementieva is multidisciplinary artist, professor at Royal Academy of Fine Arts of Brussels, Belgium. In her installations, she uses various art forms on an equal basis: dance, music, cinema and performance. Akin to an explorer she raises questions related to social psychology and theories of perception suggesting solutions to them by contemporary artistic means. Dementieva received the first prize for the best mono-channel video at VAD Festival (Girona, Spain). Dementieva is an author of multiple publications (including Leonardo Journal) and organized and contributed to symposiums and panel discussions (including hosting The Leonardo / LASER Talks in Brussels) for universities and festivals. Her works are exhibited worldwide, including Rubin Museum (New York), the Hermitage Museum (St. Petersburg), MMOMA (Moscow), MACRO Museum (Rome), the Pushkin State Museum of Fine Arts (Moscow), Centro de la Imagen (Mexico City, Mexico), Neuberger Museum of Art (USA). Lives and works in Brussels, Belgium.
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Anna Frants
Artist, curator in the field of media art. Frants graduated from the Vera Mukhina Higher School of Art and Design (Leningrad, USSR) and Pratt Institute (New York). Founder of the nonprofit cultural foundation CYLAND Foundation Inc. Co-founder of CYLAND Media Art Lab and Cyfest. Frants' interactive

installations have been showcased at Museum of Art and Design (New York), Video Guerrilha Festival (Brazil), Manifesta 10 Biennale (2014, St. Petersburg), Hermitage Museum (St. Petersburg), Chelsea Art Museum (New York), Russian Museum (St. Petersburg), Kunstquartier Bethanien (Berlin), Hatcham Church Gallery, Goldsmiths, University of London (UK), Dartington Estate (UK), Ca' Foscari Zattere Cultural Flow Zone (Venice, Italy), MAXXI Museum (Rome, Italy), National Arts Club (New York), and at other major venues all over the world. The artist's works are held in the collections of the Russian Museum (St. Petersburg), Museum of Art and Design (New York), Sergey Kuryokhin Centre for Modern Art (St. Petersburg) and Kolodzei Art Foundation (New York) as well as in numerous private collections. Lives and works in Miami, USA.
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Natalia Kolodzei
Natalia Kolodzei, an honorary member of the Russian Academy of Arts, is a curator and art historian. Ms. Kolodzei is also Executive Director of the Kolodzei Art Foundation, and, along with Tatiana Kolodzei, owner of the Kolodzei Collection of Russian and Eastern European Art, containing over 7,000 artworks of nonconformist and contemporary art (paintings, sculptures, works on paper, photography, kinetic and digital art) by over 300artists. Since 1991, Ms. Kolodzei has curated over eighty shows in the US and Europe. She is an author and editor of multiple publications (including Leonardo Journal) and organized and contributed to symposiums and panel discussions (including co-hosting The

Leonardo / LASER CYLAND, CAA, Ars Electronica) for universities and exhibitions worldwide. In 2010 she was a member of Culture Sub-Working Group under the US-Russia Bilateral Presidential Commission. Lives and works in Highland Park, New Jersey, USA
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Janine Randerson
Artist, writer and curator Janine Randerson, is an Associate Professor in Art and Design at AUT University, Tāmaki Makaurau Auckland, Aotearoa New Zealand. Her video, and media artworks are exhibited in the Asia-Moana region and internationally. She often practices in collaboration with community groups, mana whenua, and environmental scientists from urban meteorologists to glaciologists. Janine's book "Weather as Medium: Toward a Meteorological Art" (MIT Press, 2018) focuses on modern and contemporary artworks that engage with our present and future weathers. She has curated programmes with *CIRCUIT: Artist Film and Video Aotearoa New Zealand*. Janine is currently working on the online collaboration *Haupapa: The Chilled Breath of Rakamaomao* (Shearer, Bull, Purdie, Marks, Randerson) as part of the digital curatorial project Huarere: Weather Eye, Weather Ear with Te Tuhi gallery and the World Weather Network. She is a board member of Artspace Aotearoa, and she was a found trustee of Aotearoa Digital Art (ADA) network.
https://ada.net.nz/
http://www.lenlyefoundation.com
http://haupapa.space/

Bridging Knowledge: Connecting New Media Art Archives Panel

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Abstract

The Connecting New Media Art Archives project has been developing a methodology to enable the sharing of information between currently 'siloed' online repositories of New Media Art. With representatives from collections across the globe, this panel will examine the design and technical implementation decisions required to actualize connecting information in the archives.

Creating connections between new media art archives involves technical, resource-availability and coordination challenges. To mitigate and adapt to such constraints, a clear articulation of the purpose(s) of connection can help to identify functional requirements and thus provide direction in technical choices. Accuracy, integrity and discoverability are our core principles. By creating an automatable methodology, the overarching goal to create a network of interconnected knowledge related to new media art is closer to realisation.

Keywords

archive, connectivity, new media art, online archive, discoverability, networked information, automation

Introduction

The Connecting New Media Art Archives pilot project is a joint effort between the Archive of Digital Art (ADA), Ars Electronica Archives, Electronic Language International Festival (FILE), International Symposium on Electronic Art Symposium Archives (ISEA) and ACM SIGGRAPH History Archives. These organizations have been focused on the development of online open access archives of information related to new media art in an effort to preserve this valuable knowledge. The Connecting Archives project has developed during the past year an approach which focuses on the accuracy, integrity and discoverability of information already documented, by conducting comparisons between archives' data structures, functionality, and a survey of data completeness. This quantitative approach identifies commonalities which can be leveraged for automation.

Accuracy and Integrity of Information

The archives that are involved in the Connecting Archives initiative all have different goals, and therefore content and structures. For example, ADA seeks to "expand the concept of documentation" by including technical material generated in support of the creation or exposition of a new media art piece, whereas the SIGGRAPH History, ISEA and FILE archives document specific artifacts, experiences and presentations presented at a specific exposition.

Given the different purposes, maturity, and resources found across the domain of our overlapping collections, the comprehensiveness of information may vary between archives. Thus over the past year the project has surveyed information held in each archive by creating a Common Data Model. By analysing the model, the project has identified and selected data related to "persons" as a starting point for our "connecting" activities prototype activities. Through the use of a central hub, an archive will be able to indicate that it has content about a specific individual and thus provide an opportunity for other archives to reconcile this information with their own.

Discoverability

The initial investigations described above focus on a methodology which lends itself to automation, which is key to enhancing discoverability: Researchers, educators, artists and community members seeking information about new media artists and scholars currently depend on Internet search engines, which prioritize results based on algorithms which often de-emphasise less traversed sites and obscure information. However, search engines do weight the results of the search on the number of other sites which link to matching pages, as well as other criteria. Thus, a higher degree of links between disparate online archives increases discoverability by search engines. Developing automations for this process will sustainably increase the prominence of archives without operational burdens of the archives' administrators. Using the connection of information related to people as a starting point, the next step will be to connect information related to art events. By linking data related to people and art events located in each archive, we seek to broaden the publicly available information related to new media art with the hopes of inspiring future generations and facilitating innovative research.

Archive of Digital Art (ADA)

The Archive of Digital Art has documented the rapidly evolving field of digital art since 1999. This research-oriented overview of works at the intersection of art, science, and technology has been developed in cooperation with international media artists, researchers and institutions as a collective project. Since today's digital artworks are processual, ephemeral, interactive, multimedia-based, and fundamentally context dependent, they require a modified, or "expanded concept of documentation." Thus ADA documents, in addition to artworks themselves, technical information and media preservation data through cooperation with artists.

Electronic Language International Festival (FILE)

Throughout its history, FILE - Electronic Language International Festival, has built a unique collection of its kind, having held 50 exhibitions, exhibiting more than 8,000 national and international works in the field of art and technology, and exhibiting artists from 48 countries. The FILE archive uses a free software plugin, TAINACAN, and includes files in different formats, such as digitized publications, biographies, synopses, photographic records of exhibitions and works, as well as information on symposiums, workshops, artistic performances, and festival awards.

ISEA Symposium Archives

The International Symposium on Electronic Art (ISEA), consists of an academic conference, accompanied by art events and supported by workshops. The ISEA archive initiative documents the material presented and exhibited at ISEA symposia. Currently there are two online archives. The Classic contains text, PDF and links to videos whereas the New Archive is built using a database and taxonomies and includes relationships between data fields. The two archives act in tandem with text information researched, formatted, and added to the classic archive and then moved to the new archive to be interconnected to the existing data.

ACM SIGGRAPH History Archive

ACM SIGGRAPH is a Special Interest Group of the Association for Computing Machinery (ACM) on Computer Graphics and Interactive Techniques. Since 1974, the SIGGRAPH organization has hosted an annual conference showcasing some of the world's most innovative and creative research and endeavors in the field. The ACM SIGGRAPH History archive serves as the central repository for information from the SIGGRAPH conferences, the SIGGRAPH Asia conferences, the Digital Art Community online exhibitions, and other SIGGRAPH content. This online archive is supported by a physical archive containing printed material and artifacts which is currently housed at Bowling Green State University.

Author(s) Biography(ies)

Carl Hoffmann is an information architect and project manager specialising in the development and lifecycle of semi-structured information repositories with experience across a variety of industries and cultural domains. He is currently Project Manager of the "Infrastructures for Digital Arts Teaching and Research in Higher Education" a 4 year project at the Center for Image Science at the University for Continuing Education, on the Danube in Krems, Austria while pursuing his Master of Arts in Media Art History.

Paula Perissinotto is specialized in new media, contemporary art and digital culture. Co-founder, organizer and curator of FILE, the International Electronic Language Festival. PHD student at Arts | ECA, in Visual Poetics. Member of the Realidades Research Group licensed by CNPq, led by Profa. Dr. Silvia Laurentiz. Master's in Visual Poetics by ECA (School of Communications and Arts of USP University of São Paulo) with specialization in Curatorship and Cultural Practices in Art and New Media by MECAD / ESDI in (Barcelona / ES). Since 2020 has been coordinating the FILE archive Project. archive.file.org.br.

Terry C. W. Wong is an archivist and co-organizer for the ISEA Archives. He has a bachelor's degree from the Applied Science Department of the University of British Columbia and a Master's degree in Fine Art at the Chinese University of Hong Kong. Currently, he is working on his graduate research study on connecting new media art archiving worldwide in the School of Interactive Arts and Technology at Simon Fraser University. Terry has been involved with the development and organizing the New Media Art Archiving Summit since 2017. He is currently a member of the organizing committee for the Summit. Before working in new media art archiving, he was also an engineer, artist, and a member of the ISEA2016 organizing team.

Bonnie Mitchell is a digital artist, animator, archivist as well as a professor of Digital Arts at Bowling Green State University in the USA. Her creative work includes interactive installation art, environmental data visualization art, experimental visual music animation, net-art, and new media art archive development. Bonnie is the co-director of the SIGGRAPH History and ISEA Symposium online Archives. She is also a member of the ISEA International Advisory Committee, the ACM SIGGRAPH History and Digital Arts Committees and is the SIGGRAPH 2023 History Chair in charge of the 50th conference celebration.

Summit on New Media Art Archiving: Strategic Planning for the Future

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Abstract

The Summit on New Media Art Archiving (SNMAA) is volunteer-based undertaking which operates on minimal self-sustainability. The goal of the workshop on strategic planning is to enhance the Summit's organisational structure, its capacity of operation and effectiveness, as well as to enable long term sustainability and linkage of New Media Art Archives (NMAA).

Keywords

Sustainability, strategic planning, self-evaluation, new media art archiving, SNMAA

Introduction

The workshop is designed to enable active participation and output-oriented collaboration among the SNMAA partners. The task of the panellists is to gather data and produce a developmental scenario—Map of SNMAA—an organic evolutionary model based on self-evaluation, self-organisation and self-management. The outcomes will be presented at the 3rd SNMAA, ISEA2023 in Paris, which will be an occasion to further interaction with the public and other presenters at the Summit about the future perspectives.

The map of SNMAA will consist of texts, charts and infographics, specifically in relation to:

1. Identity and differentiation of an organisation (mission, vision, goals, impact, expected results)
2. Resources (information, technical, spatial, financial, know-how)
3. Funding (public funding, donations, sponsorships, partnership, in-kind)
4. Strategic programmes and strategies to secure sustainability
5. Public attention (network and audience piramid)
6. Self-evaluation (SWOT analysis: Strengths, Weaknesses, Opportunities, Threats)

The work process, performed by specialised task forces, is tailored to use the knowledge and skills of the Summit partners in order to enhance self-organisation capacity. The outcome will be the Map of SNMAA out of which various derivatives will be made: in-house hand-out, long-term strategic plan, presentation, collateral design, etc.

During 2023/24, the SNMAA developmental scenario will be used to expend strategic programmes and create a multi-year operative plan which would be the ground document for intersectorial and transdisciplinary linkage.

Figure 1. Third Summit on New Media Art Archiving Promotional Material © SNMAA 2022. Design: Memoduct. Photo: Bonnie Mitchell.

Workshop Assignment

The workshop goal is to build and discuss a feasible developmental scenario that will cover all levels of an organisation of the SNMAA as a nomadic event, a network and an initiative aimed at linkage New Media Art Archives. The

panellists will start from the question: *What SNMAA should become and how to accomplish that?* Their assignments will be focused on a strategic planning that could secure survival and essential supporting structure of the SNMAA. They will also identify shared values and goals that could act as the mobilising force of the NMAA community. Developmental scenario will help to measure the future performance and the impact of chosen strategies.

The scope of planning will include: 1) SNMAA as an annual event; 2) organisation structure; 3) financial framework; 4) the network range and the relations with the actors in the new media art field; 5) SNMAA vision.

The centre of interest and activity of the panellists will be development of the proactive strategies and identification of the long-term goals. The proposition from which developmental strategies will be inferred is that the cooperation based on common interest and public commitment should further lobbying and support gathering capabilities of the SNMAA, and increase its visibility and recognition within the art field.

In line with the SNMAA *raison d'être*—which is to connect new media art archives worldwide—the workshop will also reflect on the issue of partners' resource sharing: know-how, information, spatial (physical/virtual) and technical. Harmonisation of professional standards of operation between partners will help to solve the problem of internal heterogeneity. The *networking* and *linkage* strategies of the SNMAA will be based on the values incorporated in development of the early communication networks (Internet),

specifically: *best-effort, autonomy, digitalisation and decentralisation*.

Panellists Biographies

Violeta Vojvodic Balaz (MEMODUCT Group), a media artist and researcher. Violeta holds a PhD from the Faculty of Fine Art (Belgrade). She received a European Diploma in Cultural Management (Brussels), her research was focused on strategic planning, virtuality and cybernetics. Together with Eduard Balaz she founded Urtica, art and media research group (Novi Sad, 1999-2012). She was one of the co-founders of Center_kuda.org in Novi Sad (2001). In 2020, she founded web-based research initiative MEMODUCT posthuman.archive.

Wim van der Plas (ISEA archives), a co-founder of ISEA. Wim studied Social & Cultural Sciences at the Erasmus University Rotterdam. He was director of the Foundation of Creative Computer Applications (Rotterdam) and the National Institute for Computer Animation (Groningen). He worked for the Utrecht Art School, the Minerva Academy and the Utrecht University of Applied Sciences. He is ISEA Symposium archivist and Honorary Chair of the ISEA International Advisory Committee. He received a Leonardo Pioneer Award in 2018.

Terry Wong (ISEA archives), Terry C. W. Wong is an archivist and co-organizer for the ISEA Archives. He has a bachelor's degree from the Applied Science Department of the University of British Columbia and a master's degree in fine art from the Chinese University of Hong Kong. Currently, he is working on his graduate

research study on connecting new media art archiving worldwide in the School of Interactive Arts and Technology at Simon Fraser University. Terry has been involved with the New Media Art Archiving Summit since 2017. He is currently a member of the organizing committee for the Summit and co-directing the third Summit on New Media Art Archiving at ISEA2023 Paris with Wim van der Plas. Before working in new media art archiving, he was also an engineer, artist, and member of the ISEA2016 organizing team.

Bonnie Mitchell (ISEA archives and SIGGRAPH archive), a digital artist, animator, archivist as well as a professor of Digital Arts at Bowling Green State University (Ohio). Her creative work includes interactive installation art, environmental data visualisation art, experimental visual music animation, net-art, and new media art archive development. Bonnie is the co-director of the SIGGRAPH History and ISEA Archives, a committee member of the ISEA and the ACM SIGGRAPH History and Digital Arts. She is the SIGGRAPH 2023 History Chair in charge of the 50th conference celebration.

Janice Searleman (ISEA archives and SIGGRAPH archive), a professor of Computer Science at Clarkson University (NY) for 37 years. Since retirement in 2015, she has been an Adjunct Research Professor at Clarkson. Her research areas are Virtual Environments, Human-Computer Interaction, and Artificial Intelligence. She is co-director of the ISEA Symposium Archive and ACM SIGGRAPH History Archive, and a member of two ACM SIGGRAPH Committees: Digital Art (DAC) and History. Jan and Bonnie

Mitchell coordinated a DAC Online Exhibition "The Earth, Our Home: Art, Technology and Critical Action".

Byeongwon Ha (University of South Carolina), an assistant professor in Media Arts in the School of Visual Art and Design at the University of South Carolina (Columbia). As a new media artist, he has been taking part in international conferences and festivals art such as CHI, SIGGRAPH Asia, ISEA, and ARTECH since 2012. His research traces a transition from analog media, including film, architecture, and video, to new media. Dr. Ha has published articles as an author in Leonardo Music Journal (MIT Press) and as a coauthor in Leonardo (MIT Press).

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SNMAA Partners: the Archive of Digital Art (ADA), the archive for the Histories of Media Art, the Ars Electronica archive, the ZKM archives, the SIGGRAPH History Archive, the SIGGRAPH Digital Arts Community, the Electronic Language International Festival (FILE) archives, and the MEMODUCT.