



DTAD Introduction Project :: Future Societies

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SAVE IT FOR LATER

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:: SAVE IT FOR LATER ::

:: Documentation and State of the Art ::

## Abstract

This project explores how archiving changes when the object of archaeology is no longer purely physical but also digital.

While traditional archaeology works through a linear timeline, relying on material persistence that allows interpretation even centuries later, media art does not offer this stability. As technology, context, and exhibition conditions disappear, the possibility of retrospective archiving collapses.

Rather than treating the archive as a neutral container, this project approaches archiving as an active and irreversible act. Access becomes transformation, and preservation is inseparable from loss. Each reinterpretation of the work alters what can be remembered.

The installation presents four artworks simultaneously through process and live recordings, navigable timelines, and progressive decay. Visitors are allowed a single act of preservation: selecting and printing one moment in time. This act produces both a physical trace and an irreversible degradation of the system.

What remains after the exhibition is not the work itself, but a fragmented, insufficient archive composed of chosen moments. The project does not attempt to solve the problem of preserving media art. Instead, it makes the impossibility of preservation visible.

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## 01. INTRODUCTION

The project began with a simple question: what will the archaeology of the future look like?

Archaeology constructs knowledge from fragments. Meaning is produced through incomplete remains, temporal gaps, and acts of interpretation. Museums and archaeological sites present these fragments as traces of the past, allowing historical narratives to be reconstructed long after the original context has disappeared.

However, much of today's cultural production exists within digital environments rather than physical space. If contemporary artifacts are increasingly digital, the archaeology of the future may no longer involve material ruins but digital traces.

This shift raises new questions about preservation. While physical artifacts persist through material continuity, digital works depend on technological systems that constantly change. As these infrastructures evolve, the possibility of reconstructing the past becomes unstable.

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## 02. STATE OF THE ART

### Archaeology, Fragments and Interpretation

Archaeology does not recover the past as a complete record but reconstructs it through fragments. The objects that survive over time provide partial evidence that must be interpreted from the perspective of the present.

Historical knowledge therefore depends not only on what survives but also on how these remains are interpreted, archived, and contextualized. Archives do not simply store information but shape how history becomes readable. What is preserved, how it is documented, and under which conditions it is accessed all influence the meanings that can be produced from it.

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### Ruins, Material Processes and Interpretation

During the research process we examined ruins in Weimar, particularly the Tempelherrenhaus and the nearby Künstliche Ruine in Ilmpark. While the Tempelherrenhaus represents a structure shaped by historical and environmental processes, the artificial ruin was intentionally designed to resemble a historical collapse.

Encountering these two structures raised questions about authenticity and interpretation. Without historical context, both appear as fragments of the past. Their meanings must be reconstructed through speculation, interpretation, and partial evidence.

This perspective on ruins was further shaped by Kyle McDonald's project *Future Fragments*. In this work, textual quotations are encoded into a phonetic color system where each phonetic unit corresponds to a specific color. These color values are printed as small pixels, transforming language into a visual code.

Over time, environmental factors such as sunlight, humidity, and physical wear alter the colors. When the encoded message is decoded again, the resulting text differs from the original because the color values have changed.

The work demonstrates how fragments can survive while their meaning gradually transforms. Similar to archaeological ruins, the original message is no longer fully accessible. Instead, interpretation must rely on traces shaped by material change.

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### Digital Transformation And Glitch

If future archaeology deals with digital artifacts, the processes of transformation differ from physical decay. Instead of erosion or weathering, digital works change through technological infrastructures.

This condition became evident in the work of Rosa Menkman, whose artistic practice investigates glitches and technological errors. In one case discussed during the research process, a digital artwork that had previously been created was later reopened using a different software environment. Although the file itself remained the same, the visual output changed significantly due to software updates and infrastructural differences.

The work could still be accessed, but it no longer appeared in its original form. What remained was a transformed version shaped by technological conditions.

This situation resembles the logic of ruins: fragments survive, but their meaning is no longer identical to the original.

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### Archiving Media Art

These questions are also addressed in discussions on media art preservation. Publications such as *Preserving and Exhibiting Media Art* outline the challenges institutions face when attempting to archive time-based and digital artworks.

Unlike traditional objects, media artworks depend on specific technological environments including software, hardware, and display conditions. Museums often attempt to document these works by recording technical specifications, installation instructions, and contextual information so that they can be reconstructed in the future.

However, these methods reveal a fundamental limitation. Technological infrastructures evolve rapidly, and many systems become obsolete within a short period of time. Even when documentation exists, the reconstructed work may behave differently from the original.

Archiving media art therefore does not preserve a stable object but produces a set of traces that attempt to describe something that can no longer be experienced in its original form.

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## 03. PROJECT APPROACH

Rather than attempting to solve the problem of archiving digital works, the project approaches the archive itself as an unstable system.

Archiving is not treated as a neutral container of information but as an active process that inevitably transforms what it records. Access becomes a form of intervention, and preservation becomes inseparable from loss. This perspective guided the conceptual development of the installation.

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## 04. INSTALLATION

The installation presents four artworks simultaneously through a system of screens that display process recordings, live camera feeds, and fragmented excerpts of the works.

Visitors are not able to freely navigate the archive. Instead, each visitor is allowed a single act of preservation: selecting and printing one moment exactly as it exists at that time.

However, this act permanently alters the system. Each print introduces digital degradation that gradually transforms the archive. As more visitors interact with the installation, the archive shifts further away from its original state.

The printed images create physical traces of the archive while the digital system itself becomes increasingly unstable.

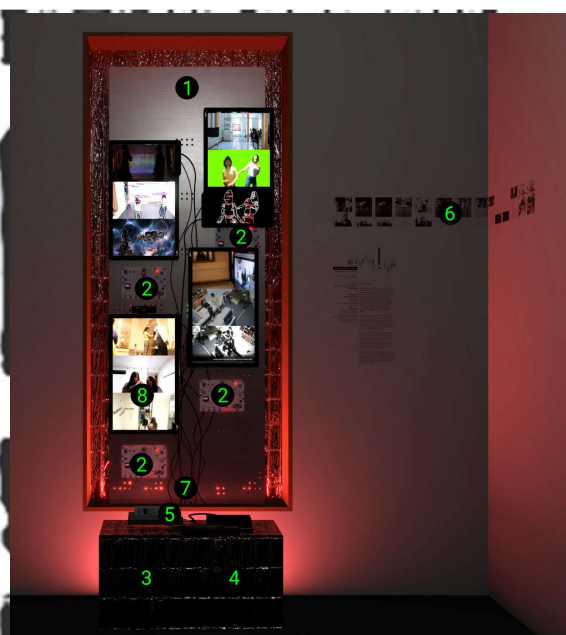
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## 05. FINAL DESIGN

### 05.1. Final Physical Set-up

After iterating through multiple design proposals and technical constraints, the final physical setup converged on a configuration that foregrounds the act of archiving media art as a participatory, ephemeral experience. The installation consists of a central monitor tower structure, a thermal printing station, two dedicated computers, and four Arduino-based interaction units — all working in concert to allow visitors to capture and physically receive a moment from a live media art exhibition.

The perforated metal sheet (1) houses four screens arranged vertically, each divided into three zones from top to bottom: a process video, a live recording feed, and the final artwork output of one of the four project groups in the class. The tower is mounted against the window. A documentation wall (6) placed beside the tower displays printed process images and written notes from the four groups, simulating a conventional archive display.



Each monitor has a corresponding Arduino interaction unit (2) placed at its base, equipped with a small LED screen displaying a scrolling "Press the button to archive" prompt and a physical button. When the button is pressed, the signal is sent to the computer (3 or 4) that monitor is connected to, triggering a screenshot and a print command. Since only one computer (3) is connected to the thermal printer (5) via USB, the second computer (4) communicates with the first over the local network using OSC protocol — sending print triggers through OSC Out and OSC In nodes in TouchDesigner. The thermal printer (5) is mounted on a dedicated stand positioned in front of the monitor tower, making the printed output immediately accessible to visitors.

The equipment used in the final design is listed below:

1. Perforated metal sheet (custom frame with 4 monitors, red LED border)
2. Arduino interaction units x4 (Funduino buttons + small LED displays)
3. Computer A (MacBook / PC – connected to Monitors 1 & 2, printer, OSC receiver)
4. Computer B (MacBook / PC – connected to Monitors 3 & 4, OSC sender)
5. Thermal printer (USB, connected to Computer A)
6. Documentation wall
7. USB cables, network cables, HDMI / DisplayPort cables
8. Two webcams for the archive and live recording.

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### 05.2. Installation Process for the Final Set-up

- a.** The monitor tower structure was assembled and the four monitors were mounted and cabled.

The frame was constructed and the monitors were secured in their vertical arrangement. Each monitor was connected to its respective computers via HDMI or DisplayPort. The red LED strip was fixed around the inner border of the frame and connected to power. The full structure was then placed on the plinth.

- b.** The Arduino interaction units were configured and positioned.

Four Funduino boards were programmed to send a serial signal on button press. Each board was paired with a small LED display running a scrolling "Press the button to archive" message. The units were placed at the base of their corresponding monitors and connected to the appropriate computer via USB.

- c.** The thermal printer was installed on its stand and connected to Computer A.

The thermal printer was mounted on a freestanding stand positioned in front of the monitor tower, at a height accessible to visitors. The printer was connected to Computer A via USB. Print drivers were configured and test prints were run to confirm paper feed, image sizing, and contrast levels.

- d.** The OSC communication link between the two computers was established and tested.

Since the printer could only be physically connected to one computer, an OSC (Open Sound Control) bridge was set up between Computer A and Computer B over the local network. Computer B sends a print trigger via OSC Out in TouchDesigner when a button press is detected for Monitors 3 or 4; Computer A receives this via OSC In and executes the print command. Latency and packet loss were tested to ensure reliable communication during the exhibition.

- e.** The NDI video streams from the other project groups were connected.

Each of the four student project groups' computers was set up to broadcast their process video, live camera feed, and final artwork output via NDI Out nodes in TouchDesigner. The archiving installation's computers received these streams using NDI In nodes, composited them into the three-zone layout per monitor, and rendered them in real time. Network stability and stream synchronization were verified before the exhibition opened.

- f.** The full setup was tested end-to-end before the exhibition.

A complete run-through was performed: button presses on all four units were tested, screenshot capture and print output were confirmed for both computers, the glitch progression logic (five levels before reset) was verified, and the visitor print-hanging area was set up with hanging wire or rail and a supply of pins or clips.

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### 05.3. Final Digital Set-up

The digital layer of the installation was built in TouchDesigner and runs across two computers that share responsibility for display, interaction logic, and printing. The system is designed to behave as a living archive: it receives live video data from the other exhibition projects, stages it for visitors, and responds to physical interaction by degrading the image – a deliberate conceptual choice to make the act of archiving leave a mark.

#### Video Input and Layout

Each of the four project groups broadcasts three video streams via NDI Out from their own TouchDesigner setup: a process video, a live camera recording of their installation, and their final artwork output. The archiving computers receive these via NDI In nodes and arrange them into a vertical three-zone composite per monitor (process on top, live recording in the middle, artwork at the bottom). This composite is rendered in real time and output to the corresponding monitor.

#### Interaction Logic and Glitch Progression

The core interaction mechanism is built around a Count CHOP feeding into a Cross TOP. Each button press increments the counter associated with that monitor. The Cross TOP uses this counter value to interpolate between the original composite video and a pre-prepared glitch version of the same content, progressing through five discrete levels:

- : Level 0 – Original, unmodified composite video
- : Level 1 – Subtle color shift and scanline artefacts
- : Level 2 – Increased noise and channel separation
- : Level 3 – Block displacement and frame doubling
- : Level 4 – Heavy fragmentation and data moshing effects
- : Level 5 – Maximum glitch; triggers automatic reset back to Level 0

This means each visitor who presses a button is, by definition, the last person to see the screen in its current state. The screen they observe, and the print they receive, is a unique frozen moment – one that will not repeat until the cycle resets.

#### Screenshot Capture and Print Command

On button press, the Arduino sends a serial signal to the connected computer, which is received and parsed by a TouchDesigner Script CHOP or DAT. This triggers two simultaneous actions: the glitch counter increments (advancing the screen's visual state), and a screenshot of the current monitor composite is captured and sent as a print command to the thermal printer. On Computer B, the print trigger is also forwarded via OSC Out to Computer A, which handles the physical print for Monitors 3 and 4.

#### OSC Communication

The OSC Out node on Computer B sends a message to a fixed local IP address and port on Computer A whenever a print event is triggered for Monitors 3 or 4. Computer A's OSC In node listens on the corresponding port and routes the incoming message to the same print execution logic used for its own monitors. This architecture keeps all physical printer communication isolated to a single machine, avoiding driver conflicts and print queue collisions.

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## 6. TECHNICAL AND CREATIVE CHALLENGES FACED

### 6.1. The Single-Computer Constraint

The earliest version of the interaction concept assumed a single computer managing all four monitors, all four Arduino units, and the thermal printer. In practice, driving four simultaneous high-resolution video composites (each with three NDI streams) while also processing print commands proved to exceed what a single machine could handle without dropping frames or introducing unacceptable latency. The print action in particular caused perceptible screen freezes – a problem that, while conceptually interesting (the printer interrupts the display), could not be controlled precisely enough for a reliable interaction.

The solution was to split the workload across two computers: Computer A handling Monitors 1 and 2 and the printer, Computer B handling Monitors 3 and 4. This introduced a new challenge – two of the four Arduinos were connected to a machine without a physical printer – which was resolved through the OSC bridge described in section 05.3.

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### 6.2. Printing Glitches the Screen :: a Problem That Became the Concept

When a print command is issued to the thermal printer, the computer's graphics output briefly stutters. The screen that the visitor was looking at – the one they chose to archive – is no longer pristine. This was initially treated as a technical bug to be fixed. After several failed attempts to eliminate it (adjusting print driver settings, isolating the print process, using background threads), the team reframed it as a central design feature.

The glitch is now the mechanism: pressing the button corrupts the image you were trying to save. The thermal print you receive is the last clean record of that moment. What you see on screen after your press is already different. This aligns directly with the project's conceptual premise – that archiving media art is always an act of transformation, never pure preservation. The archivist changes what they touch.

To formalise this logic, the glitch was structured into five discrete levels using a Count CHOP and Cross TOP, so that the degradation is controlled, cumulative, and legible to the visitor rather than random noise.

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### 6.3. NDI Stream Synchronisation

Receiving NDI streams from four independent computers over a shared local network introduced synchronisation inconsistencies. Streams occasionally stuttered, dropped frames, or arrived out of phase with each other, particularly when multiple streams were active simultaneously. This was partly a network bandwidth issue (all computers sharing a single switch) and partly a result of the other groups' machines running demanding real-time processes of their own.

Partial solutions included prioritising network traffic for NDI streams, requesting that the other groups reduce their stream resolutions during the exhibition, and building a fallback

state in TouchDesigner that displays a placeholder image when an NDI source goes offline rather than crashing the composite.

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#### 6.4. Interaction Legibility :: Making the Archive Behavior Understandable Without Instructions

A recurring challenge in the design process was how to communicate the interaction logic without written instructions. The installation was conceived as instruction-free, following the same principle as the Malleable Boundaries installation in the class – visitors should discover the interaction through curiosity and instinct. However, the layered logic (press → screenshot → glitch → print → hang) is more complex than a simple sensor trigger.

Several solutions were tested. The scrolling LED text on the Arduino units ("Press the button to archive") provided a minimal verbal cue without a full instruction panel. The thermal printer positioned visibly in front of the monitors made the output medium obvious. The hanging display area, populated with prints from earlier visitors by the time the exhibition was well underway, modelled the intended behavior socially – new visitors could see what previous visitors had done and follow suit.

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#### 6.5. The Thermal Print as a Physical Archive :: Quality and Resolution

Thermal printers produce monochrome output at relatively low resolution with inherent contrast compression. Early test prints of the three-zone monitor composite were difficult to read – the process video, live recording, and artwork zones blurred together. Adjustments were made to the TouchDesigner composite to increase internal contrast, adding thin white separator lines between the three zones, and slightly enlarge the font used for any overlaid labels. A border was also added around the print area to frame it as a discrete artefact rather than a cropped screenshot.

The low resolution was ultimately embraced as appropriate: a thermal print is already a degraded, lo-fi record. Its materiality – heat-sensitive paper, monochrome, slightly faded – reinforces the installation's argument that archives are always lossy translations of the original.

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## 7. CONCLUSION

At the end of the exhibition, what remains is not the original work but a fragmented archive composed of selected moments.

Rather than solving the problem of preserving media art, the project makes the instability of archiving visible. Preservation does not produce a complete record of the past but generates partial traces shaped by acts of access, interpretation, and technological change.

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## 8. CRITICAL REFLECTION

This project did not attempt to stabilize memory; instead, it exposed how unstable memory already is. What became evident throughout the exhibition was that preservation, when embodied as an action rather than a concept, produces tension. Visitors arrived expecting to observe an archive. They left realizing they had altered it by their experience in the exhibition.

The installation shifted archaeology from a method of recovery into a living condition. Rather than excavating stable remnants, participants encountered a system in which remnants were actively produced through disappearance. The impossibility of returning to an “original state” became progressively tangible. Each print itself simply extracts a fragment stating preservation function by the experience of visitors and at same time erosion.

The accumulation of different monitors and simultaneous screens introduce a visible stratigraphy of technological time. This coexistence evokes not nostalgia, but discontinuity. Unlike the material endurance that archaeology traditionally assumes, these devices embodied temporal fragility. The infrastructure itself suggested that media memory is layered yet unstable, dependent on compatibility, signal, translation, and the fragile mediation of hubs and inputs. What appeared as a technical network revealed itself as a temporal one.

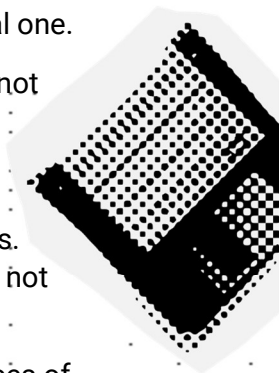
A crucial shift occurred in how visitors understood their presence. Real-time video did not simply document them; it folded them into the archive’s metabolism as observing the observers. Sensors capturing movement, sound, and proximity collecting their overall experience with the other projects transformed behavior into source of parameters. Circulation patterns, hesitation, proximity to other bodies became computational inputs. Interaction was not symbolic participation but structural interference. The archive was not something people accessed; it was something they destabilized by being there.

Over time, the glitches intensified. They were not aesthetic effects but sedimented traces of collective presence. The image materialized duration.

The single permitted act of printing revealed a particularly complex behavior. Some visitors hesitated for long periods, aware that their decision would permanently affect the system. Others printed quickly, embracing the immediacy of extraction. In both cases, the gesture exposed a paradox: the desire to save something from disappearance is inseparable from contributing to its transformation. The physical print (stable, tactile, seemingly fixed) became evidence of a digital subtraction elsewhere. What remained outside the space were these distributed fragments, insufficient to reconstruct the totality they once belonged to.

The work ultimately displaced authorship. The composite images were not solely produced by the programmed system, nor by individual visitors, but by the accumulation of interactions with all the other art works across time. The archive became a social body. People were not just recorded; they became archival agents whose presence shaped the conditions of future perception. This recursive structure blurred the distinction between documentation and event.

In the context of contemporary media environments, where everything appears infinitely reproducible, the installation insisted on finitude. It demonstrated that digital systems are not immaterial reservoirs but contingent ecologies. Preservation emerged as an ethical and political question rather than a technical one: Who decides what to extract? At what cost? And what forms of disappearance are silently normalized in the process?



What remains after the exhibition is not the work as an intact system, but a constellation of degraded data, printed fragments, and embodied memories. The archive that survives is structurally incomplete. Yet this incompleteness is not failure. It is the condition the project sought to reveal: that media memory is always partial, that every act of saving is also an act of losing. Alteration and that the desire for permanence often obscures the generative power of loss.

The project did not resolve the instability of archiving media-based art. Instead, it operationalized instability as experience. And in doing so, it made visible that archives are not containers of the past, but negotiations with disappearance unfolding in the present.

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