Open the Museum's Gates to Pirates

Hacking for the Sake of Digital Art Preservation

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ABSTRACT

Third-party software dependency is a big threat for digital art-works. In this paper, we describe our experiences with artworks such as *Remote Control* by Shane Cooper or *net.art generator* by Cornelia Sollfrank. ZKM | Center for Art and Media initiated different research projects addressing the controversial issues of cracking abandoned proprietary software or hacking an API to guarantee access to its digital art collection. We show that using crowd-sourcing efforts as sustainable preservation strategies is a promising approach as well as a trigger for new creative processes. ZKM opened its gates to pirates and hacker communities thereby acknowledging their contribution to digital art preservation.

KEYWORDS

Digital art preservation, folk preservation, piracy, API, hacking, cracking, unsupported software, proprietary software

1 INTRODUCTION

ZKM | Center for Art and Media Karlsruhe started collecting digital artworks in 1989. During this period, standardized approaches to managing digital art collections did not yet exist. Recently, ZKM had to work backwards and built a dedicated interdisciplinary team to take care of the 120 digital artworks in its collection. Two departments share this responsibility: Wissen (Collection, Archives & Research) and Museum and Exhibition Technical Services. The ZKM cross-disciplinary team is composed of electromechanical and IT engineers, registrars, restorers, media specialists, art historians, and researchers in residence working in close collaboration within a flat hierarchy.

Lately, ZKM decided to review its workflow strategies and methods. It has become paramount to improve our preservation approaches in order to develop solutions as sophisticated as the problems we are now facing or going to face in the near future. Besides the obsolescence of formats or hardware, the interdependency between hardware and software and the dependency to third-party

software and resources remain one of the biggest challenges in preserving digital art nowadays. Moreover, the planned obsolescence of the 1990s is nothing to be compared with recent products like smartphones, creating an even higher hardware-software dependency by preventing retro-compatibility or downgrading.

ZKM staff has always been encouraged and free to experiment and transform research results into hands-on procedures. Since experimentation is already a mainstream practice in exhibition scenography, presentation, and mediation, it is only natural that the preservation of the collection follows the same logic. For that reason, ZKM and the Karlsruhe University of Arts and Design (HfG), decided to think outside of the box for this matter and invited Matthieu Vlaminck, an autodidact tinkerer, programmer, and hacker to be part of the *Archivist in Residence* program [1] and a member of the team.

2 COPIES AND PROLIFERATION

First, it is worth pointing out that we usually try to maintain artworks in their historical technological environment as long as possible. Not necessarily with the computer acquired along with the artwork, it can be the same model or at least a computer from the same period compatible with the initial operating system. This way, we do not have to make major changes to the software environment or peripherals in order to avoid incompatibility issues or alterations of the artwork's behavior and outputs. It could be said, we have a strong materialist approach and know for a fact that this decision puts the team into difficult situations occasionally but this historical curiosity is motivated by our belief in the non-neutrality of technology and coding.

Unfortunately, most of the time this historical version of the artwork is only exhibited in house for research purposes due to its high fragility. We need our facilities, skills, resources, spares, and tools to install and furthermore maintain these artworks in exhibition, however we do not want to prevent other museums which might not have these resources to access our collection. Thus, for loan purposes and future exhibitions, we create updated versions the closest to the initial version within a newer technological environment for easier handling, installation, and maintenance.

We borrow the word "version" from software terminology to describe and distinguish states of development of the same program over time. This approach stems from the reproducible nature of digital objects. To this consideration, the work of Rhizome[2] and its ArtBase[3] is inspiring. This project, focused on net art, is making accessible online artworks that are no longer compatible with contemporary systems. Besides this effort toward accessibility, ZKM and Rhizome are inextricably sharing the same wish to develop strategies toward legacy versioning by archiving and maintaining both the original, untouched version as well as updated versions

of artworks.

At ZKM, updated versions are usually created with the help of the artists while the historical version is still in working order and, if not, it will be repaired or rebuilt from scratch with historical spares. We need to have a first hand experience of how the artwork operates and looks like in its given historical technological context. Furthermore, this allows us to learn more about the artist's techniques and methods to hijack certain technologies prior purposes. This experience is notable to gather vanishing knowledge, compare the results of the updating process and disseminate *genuine copies* of artworks, in reference to *Microsoft* terminology.

To keep old artworks alive, ZKM based its preservation strategy on the mantra "Lots Of Copies Keep Stuff Safe" [4]. This means we are always trying to accompany the artwork with a spare ready-to-run computer and spare hardware/peripheral if needed (mouse, camera, sensor, screen etc.). Instead of keeping the backups on our servers and magnetic tapes, we additionally implement them on spare computers in order to create multiple, identical, and functional examples of the entire hardware-software environment. First of all, since we are documenting early-acquired artworks many years later, this duplication is an easier way to gather missing information. Secondly, this allows us to act smoothly in case of a breakdown during exhibition. Additionally, this avoids discovering unknown hardware specificities, incompatibilities, or license key issues by actually testing the backups on their assigned equipment prior breakdown and therefore removes time-pressure.

For example, while making a ready-to-run computer for the artwork *Bar Code Hotel* by Perry Hoberman (1994), we discovered that the artwork's sound program, Max FAT 3.5, needed the original master floppy disk to be launched on a new computer (Fig 1) even though the backup was a disk image of the original hard-drive (operating system and software).
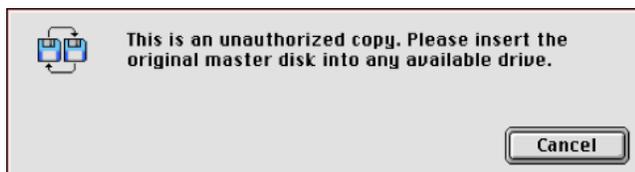

Figure 1: Screenshot of Max FAT 3.5 error message on Macintosh Classic 8

After crawling through the whole known web, we found a post from February 2006 on Max developers forum[5], *Cycling'74*. We were looking for the floppy disk or at least its disk image, the digital file of the disks content, but the post pointed out that we were looking into the wrong (legal) direction. The forum was spoiled by users complaining about losing projects because of copy protection for older versions. Some of them, like Stefan Tiedje, even "encouraged" other users to crack Max's older versions by illegally removing the copy protection since *Cycling'74* isn't releasing some of their unsupported, no longer maintained, versions to open old format files. Copies and proliferation are certainly not part of software companies' business strategy. The solutions had to come from somewhere else, in that case: the Internet.

3 PIRACY AND FOLK PRESERVATION

Introduced by Kari Kraus, the concept of "folk preservation" is applied to information studies as "preservation that is amateur rather than professional; distributed rather than centralized; and unauthorized rather than authorized" [6]. It addresses communities of pirates gathering highly skilled programmers, such as the anonymous *Xforce team*. They are anticipating museums' future needs because of their ability to eliminate any dependency issues as soon as a third-party resource is available. To crack Max FAT 3.5, we used the actual patch created by snapCASE in 1996, an unauthorized corrective program disabling the section of code checking for a valid master floppy disk. It is replaced by a portion of code that assumes that this floppy is indeed in the driver. And what is most notable is that the patch was still available more than twenty years later. These communities of amateurs are sustainable and able to safeguard their own heritage.

Already in 2008, Kari Kraus, associate professor in the College of Information Studies and the Department of English at the University of Maryland, noted that "historically we know that piracy has helped guarantee the survival of important works of literature and art" [6]. In addition, Jon Ippolito, professor at the University of Maine and co-author of the book *Re-collection: Art, New Media and Social Memory* [7], was encouraging institutions to follow crowdsourcing strategies in 2010: "Much as professional conservators might fear an army of amateurs, such "unreliable archivists" have kept their culture alive without any institutional mandate or managerial oversight" [8]. In that sense, ZKM decided to take action and stand for piracy and folk preservation.

Figure 2: Virtual studio and Anchorman of *Remote Control* by Shane Cooper

As a result, in 2017, when we were confronted with the worst possible scenario in third-party dependency, a software with a standalone license commercialized by a now-closed company, we knew exactly what to do.

Remote Control is a software-based online interactive installation created by Shane Cooper in 1999 [9]. This artwork is a piece of applied rhetoric involving a computer-animated news anchorman

reading out news reports that have been generated by accessing online resources and reassembled by a linguistics program made by the artist. This linguistics program modifies a message received from the network, a proposition, and translates it into a conditional or negative form, questioning therefore the meaning of the original message. This piece illustrates the significance of the rhetorician, the speaker, and the speech treatment in the assessment of a message. The artificial picture of the studio and the anchorman (Fig 2) denies the unconscious, visually generated seriousness of a statement in order to examine it exclusively in its linguistic form.

Cooper used a commercial 3D rendering software named *Alive!* [10] to display the artificial studio and news anchor. This software has a standalone license; it can be used only on one computer, in this case, a *Silicon Graphics Inc (SGI) O2*. In the acquisition contract, it is stated that if we need a new license to install the artwork on another O2 (to make a backup or directly replace the first one in case of hardware failure), we just had to ask the company who made *Alive! - Protozoa -* and they would give us a new license key for free. Unfortunately, *Protozoa* closed down many years ago.

Alive! utilizes the *FLEXlm* Licensing system which employs a unique *hostid* (identifier) – as unique as a fingerprint – for the machine. This means that the license file is attached to this very *O2*. Each time that the software is launched, it calls the *hostid* to see if it matches the one registered with the license: the *lmhostid* [11].

The solution is to make *Alive!* "believe" that it is still on the original machine by running a scripted program that would emulate the *lmhostid* of our choice (in this case the one from the original *O2*). We used a script based on the successive work of multiple programmers from 1996 to 2009. This program fakes the *lmhostid* before *Alive!* calls for it each time the *O2* boots. This crack makes it now possible to install the software on as many spare computers as needed to preserve the artwork in middle terms. Like any sustainable solution, this crack is open-source and can be adapted for any standalone-licensed software operating on an *O2* and *Indigo2*, both *SGI* computers.

4 SOCIAL HACKING

Effective as a preservation strategy, hacking can also be the trigger of new artistic productions. Cornelia Sollfrank's *net.art generator* [12] is a computer program which collects and recombines material from the Internet to create a new website or a new image (Fig 3). Since its creation in 1997, five different versions of *net.art generator* were created by seven programmers, all using PERL, a scripting language quite popular for text processing. "The PERL script itself is very stable and reliable, but its functionality highly depends on the connected search engines. [...] In the course of its existence the different versions of the *nag [net.art generator]* have used a number of available search engines, but it has become harder and harder over time to get free access to search engine results (via their APIs)" [13]. The latest version of *net.art generator* generates images via Google's search Application Programming Interface (API), a set of commands, functions, protocols and objects that allows programmers to interact with external systems, in that case to develop websites that retrieve and display programmatically Google's search results [14].

This version of *net.art generator* was out of order for many months in 2015: Google changed its terms of use by implementing the ID authentication procedure [15] - like Twitter and Facebook did for their own APIs a couple years earlier - and thus terminated the free unlimited access that Google used to provide in the past. Cornelia Sollfrank and the artist and programmer Winnie Soon from Aarhus University decided to make a new version of *net.art generator* by using the free offer of Google's API limited to 100 requests a day. The strategy was to leave *net.art generator* in its limited version and send an error message when the 100 queries were reached. This message increases the awareness of Google's limitation and the problems associated with data polities and their hegemonies. Cornelia Sollfrank is accommodating such mutations as fuel for generating new political artistic production and discourses [16].

Figure 3: Image generated by *net.art generator* with the title Star Trek

ZKM acquired the fifth version of *net.art generator* in 2010 on a local server and is therefore affected by this change of Google's terms of use. Even more since Google has not only terminated the free unlimited access but also will discontinue its special conditions for non-profit and cultural organizations this year, 2018. Of course, ZKM could pay Google for a less limited version of the API or use the limited version with the error message, which might be a good start to draw the public's attention, however ZKM wants to open the debate on such topics and support Cornelia Sollfrank's ultimate goal to draw the attention of Google on this significant unsupportive decision for cultural institutions.

Prof. Winnie Soon, in collaboration with Berlin-based programmer Gerrit Bolez, developed a version of the *net.art generator* that works via a Google hack. This work-in-progress project called *crowdapi* undermines the limiting terms of use by automatically changing the ID key after the 100 queries are reached. By donating their ID key to ZKM or to Cornelia Sollfrank, the public would actively keep the artwork alive. This social hacking solution may help to think about power relationships between corporations and users.

The changes related to the use of social media by artists are a challenge that affects every museum and major institution in Europe and across the Atlantic. ZKM, Cornelia Sollfrank, Winnie

Soon and others are committed to share the results with other institutions. Confronted with such a challenge, we have to think as distributed as the companies are centralized.

5 CONCLUSION

Communities of amateurs are able to safeguard their own heritage for more than twenty years despite copy protections and aggressive business models while museums and cultural institutions are struggling due to high time and money cost, as well as difficulty finding skilled persons for digital art preservation. After LIMA's *Transformation Digital Art* symposium[17], held in Amsterdam last March, it became clear that sharing our solutions, skills, and resources is the key. This is why we would like to make a call to all institutions and museums committed to preserve their digital art collections to participate, in collaboration with the ZKM, to the first communication hub and sharing platform aimed at bridging Internet resources and museums research together. This platform could be based on existing systems such as *arXiv* [18], Cornell University open access e-print library, *reddit* [19], a community bookmarking website, or *GitHub* [20], a web-based service for distributed version control and source code management commonly used to host open-source software projects. These ideas are opened to discussions since this future project is aimed to be collaborative, open, and distributed. Portions of code, patches to crack unsupported software, hardware blueprints, discussion forums for sharing problems and solutions will be published for the whole community in the Copyleft spirit. Awareness from commercial companies is unlikely going to increase in the near future, so instead of waiting and hoping that they maintain their resources or bend the knee at each business strategic move, we simply deploy our strengths.

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