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.

References

[1] Boyd, Andy. “Archiving the Ephemeral.” *PAJ: A Journal of Performance and Art* 43, no. 2 (2021): 116–18. https://doi.org/10.1162/pajj_r_00571.

[2] Cooks, V W. “Is Photography Considered to Be Art?” Ina Contemporary Art. Ina Contemporary Art, 2020. https://ina-contemporary.art/art/is-photography-considered-to-be-art/?amp.

[3] Daniels, Dieter, Gunther Risinger, Christian Paul, Anna Bentkowska-Kafel, Wolfgang Ernst, Verena Kuni , Barbara London, Marc Ries, Robert Sakrowski, and Julian Stallabrass. “Context and Archive: Presenting and Preserving Net-Based Art.” Essay. In *NET Pioneers 1.0 Contextualizing Early Net-Based Art*. Berlin: Sternberg Press, 2010.

[4] DeGroat, Bernie. “A New Frontier: Preserving Computer and Video Games at the U-M Library.” University of Michigan News. University of Michigan News, January 13, 2022. https://news.umich.edu/a-new-frontier-preserving-computer-and-video-games-at-the-u-m-library/.

[5] Ensom, Tom, and Jack McConchie. “Preserving Virtual Reality Artworks.” Tate. Time-based Media Conservation, Conservation Department, Tate, August 13, 2021.

https://www.tate.org.uk/documents/54/tate_pim_preservingvrartworks_01_00.pdf.
[6] Paul, Christiane. “Articles.” Christiane Paul. Accessed September 17, 2022. http://www.christianepaul.info/articles/.
[7] Pierce, David. “The Survival of American Silent Feature Films: 1912–1929.” Council on Library & Information Resources. The Library of Congress, September 2013. https://www.loc.gov/programs/national-film-preservation-board/preservation-research/silent-film-database/.
[8] “Software Library: Classic PC Games.” The Internet Archive. The Internet Archive. Accessed October 20, 2022. https://archive.org/details/classicpcgames.
[9] “Software Library: MS-DOS Games.” Software Library: MS-DOS Games : Free Software : Free Download, Borrow and Streaming : Internet Archive. The Internet Archive. Accessed October 20, 2022. https://archive.org/details/softwarelibrary_msdos_games.

Authors Biographies

Zeynep Abes is an artist, curator and educator from Istanbul, Turkey. She studied film and interactive media at Emerson College, later getting her start at LACMA’s Art+Tech lab creating AR installations. She then worked at the Sundance Film Festival's New Frontier Exhibitions and is a recent graduate of UCLA’s Design Media Arts MFA program. She is currently a Ph.D. candidate in the Media Arts and Practice program at USC’s School of Cinematic Arts. She primarily works with archived photography, video, photogrammetry and immersive media. Her subjects revolve around identity, history, and loss of memory. She is in pursuit of exploring the role artists play in preserving memories to navigate the struggle and alienation that arise from changing social environments and shifting identities.