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Obsolescence, Forgotten: "Survivor Holograms", Virtual Reality, and the Future of Holocaust Commemoration

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Abstract

"Survivor holograms" and a VR rendition of the Majdanek concentration camp are two recent examples of the urgent effort to preserve the experience of Holocaust survivors in the "post-witness era." These innovations, however, deny the tension between the premise of immortality associated with immersive technologies and their inherent planned obsolescence. By closely studying the USC Shoah Foundation's Dimensions in Testimony, this essay explores how 3D digital projections and room-scale VR construct new regimes of mediation and immersion. This is achieved by developing an understanding of obsolescence as physical (the fragile body of the survivor), technological (non-compatible hardware, software, and algorithms), and narratological (turning testimonies into fragmented soundbites). Taken together, these categories demonstrate that technological solutionism cannot prevent embodied testimonies from sinking into oblivion, and force us to ask what form of memorialization might resist entropy.

Keywords: Virtual Reality; Holocaust; Hologram; Immersive narratives; Embodiment.

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I will give them an everlasting name.

(Isaiah 56.5)

1 Introduction: "Maybe You Should Try to Reboot"

Davina Pardo's short film *116 Cameras* (2017) is a documentary investigation of USC Shoah Foundation's project Dimensions in Testimony. The titular cameras refer to the rig surrounding a Light Stage used to record over twenty testimonies of Holocaust survivors since 2012. The stage is the same geodesic dome used in Hollywood films such as *Spiderman* (2002) and *Avatar* (2009). The documentary's protagonist is not a fictional superhero, however, but rather a Holocaust survivor named Eva Schloss, whose testimony is about to become a 3D digital projection. *116 Cameras*, released as part of the *New York Times'* Op-Docs series, documents the process by which Schloss' testimony is pre-recorded and later rendered as an interactive 3D projection.

Such digital projections are often described by media scholars and the popular press as holograms (de Jong 2018, Frosh 2016, McMullan 2016). Yet, this term is inaccurate because, as USC Shoah Foundation clarified in a press release, "to date the technology to display a hologram does not exist."[1] Instead, the press release uses the term "interactive biographies." Nonetheless, they are impressive technological feats that update and extend the decades-long cultural fantasy of holographic rendering. Integrating advanced filming techniques, specialized display technologies, natural language processing, and speech-recognition algorithms, Dimensions in Testimony (DT) offers students and museumgoers the chance to have something closely resembling an in-person conversation with a Holocaust survivor long after the last survivor has perished. Each 3D digital projection includes the answers to over one thousand questions, ranging from the highly personal ("What was your most emotional moment in the concentration camp?") to the philosophical and ethical ("How can we prevent future genocides?"). As described on the USC Shoah Foundation website, "the program matches questions with the survivor's most relevant response. Over time, the exhibit 'learns' and the relevancy rate and speed of the survivor's responses improves." The result, according to the creative team, "simulates face-to-face interaction."[2]

Pardo's film follows the weeklong process of interviewing Schloss about her wartime experience as she sits in the middle of the Light Stage. Surrounded by thousands of LED lights and dozens of cameras, the 88-year-old refers to this cutting-edge setting as "the cage."[3] About a third of the way through the film, there is a brief moment captured by Pardo. This scene, though seemingly inconsequential, provides us with a surprising entryway into understanding recent attempts to reinvent Holocaust remembrance in the "post-witness era" (Popescu 2015: 1) when fewer and fewer survivors are capable of sharing their experience in person. In an attempt to record "neutral moments" (Pinchevski 2019: 93) that will create a more seamless experience during future "conversations" between Schloss' projection and its users, the interviewer asks Schloss to repeat several sentences designed to promote the illusion of a real-time human encounter while also troubleshooting technical issues. These phatic utterances include, "I'm actually a recording. I can't answer this question" and "I don't remember." However, when asked to repeat the phrase "Maybe you should try to reboot," the octogenarian woman hesitates: "Maybe you should try to..." The interviewer repeats, "Reboot." Schloss attempts it: "Rebook?" The interviewer quickly says, "Never mind," to which Schloss smilingly replies, "That's too technical for me."

This moment of confusion, which could easily go unnoticed amid Schloss' harrowing retelling of her memories from Auschwitz, is actually noteworthy. For a scene meant to create a humorous binary between the elderly, technologically naïve survivor and a vanguard creative team producing a "future proof testimony" (Pinchevski 2019: 93) instead exposes both the promise and peril of 3D projections. It attests to the extent to which the creators of DT are aware of the limitations of digital technologies, which frequently disconnect, freeze, buffer, and need a reboot (Alexander 2017). It also reflects a creative and ethical decision to eliminate exactly those

1. For the full promotional one-sheet of Dimensions in Testimony, see https://sfi.usc.edu/dit.

2. See https://sfi.usc.edu/dit.

3. The full documentary is available online via *the New York Times*. See https://www.nytimes.com/video/opinion/100000005201010/116-cameras.html.

elements that might turn a real-life encounter with a Holocaust survivor into a memorable experience: silence, hesitation, and fragmentation. As Shoshana Felman and Dori Laub (1992) famously argued, it is precisely those moments that perpetuate the "crisis of witnessing" whereby the memories and experiences of trauma cannot be translated into intelligible speech or linear narrative. Instead of using these moments of desynchronization to teach students about the limitations of mediated encounters, the interviewer struggles to construct an archive of explanations and solutions, an antidote to the unpredictable nature of future interactions. This decision also eliminates the subtle differences in survivor testimony that happen on separate retellings, which themselves are expressive and meaningful.[4]

This essay studies the DT archive of pre-recorded questions and answers in conjunction with another recent project initiated by the USC Shoah Foundation, the VR work *The Last Goodbye*, which premiered at the 2017 Tribeca Film Festival. Both projects share the language of interactivity and immortality both on the USC website and in their media coverage. As such, they present us with a problem, namely the diminishing number of elderly Holocaust survivors, and offer a solution: groundbreaking technology enabling us to make their firsthand authentication accessible "in perpetuity."[5] These recent approaches to Holocaust remembrance are examples of the "immersive witnessing" (Gregory 2016) that has led to a creative explosion in the field of VR and 3D projections in the last decade (Raz 2019). Committed to the mission of "never again," such projects belong to the growing category of "virtuous VR" that seeks "to preserve and transmit the experience of disadvantaged and suffering people through immersive stereoscopic video" (Nakamura 2020: 49). These projects, however, *conflate digitization with immortalization* by effectively denying the various ways in which, like every technology, they are bound to become obsolete. They ignore the ubiquity of planned obsolescence as the dominant business model in American capitalism (Slade 2007) and the extent to which both software and hardware are designed to become non-compatible and require constant "upgrades" (Chun 2016).

VR and 3D projections promise their users the ability to engage with trauma by controlling a personalized, responsive interface. This essay will not fully engage with the question of whether these technologies could or should function as "empathy machines."[6] Instead, I approach the attempt to immortalize the last remaining Holocaust survivors through the framework of obsolescence: How does the ideology of immortality associated with interactive technologies serve to deny the reality of a rapidly changing technological landscape built on planned obsolescence and non-compatible devices? How do such technologies reshape our understanding of Holocaust commemoration by producing new regimes of mediation and immersion? What are the unique aspects of "the humanitarian impulse" (Rangan 2018) aimed at "giving a voice" to an aging population of Holocaust survivors? These inquiries promote a multi-layered understanding of obsolescence as physical (the fragile body of the survivor), technological (non-compatible hardware, software, and algorithms), and narratological (transforming testimonies into disjointed soundbites). Taken together, these categories demonstrate that technological "solutionism" (Morozov 2013) cannot prevent carefully curated testimonies from sinking into oblivion.

2 From the Unrepresentable to Compatible Narratives

With their allure of groundbreaking interactivity, both VR works and survivor holograms extend the logic of the video testimonies of Holocaust survivors that began to be collected thirty-five years after the liberation of the camps (de Jong 2018: 245). Since the early 1990s, videotaping the remembrances of survivors has been described as a race against time. As the number of survivors dwindles, educational institutions such as the USC Shoah Foundation and the National Holocaust Centre and Museum in the U.K. have searched for new tools that can make their testimonies more relevant to younger, digital audiences and that, unlike the VHS cassette,

4. I would like to thank Joseph Pearson for alerting me to this potential downside of the interactive testimonies, as well as for his many useful comments on an early draft of this paper.

5. See https://sfi.usc.edu/dit.

6. The idea that VR works are "empathy machines" was popularized by American artist Chris Milk, who created a series of 360-degree documentary VR projects for the United Nations. For an overview of the current debates on empathy and VR, see Raz and Nakamura (2019 and 2020). For Milk's 2015 TED talk titled "How virtual reality can create the ultimate empathy machine" see https://www.youtube.com/watch?v=iXHil1TPxvA.

are more compatible with emerging technologies.[7] Indeed, the pursuit of a multi-sensorial, tactical mediation of trauma preceded the new immersive techniques. In *The Witness as Object* (2018), Steffi de Jong reminds us that video testimonies are often exhibited alongside a physical object belonging to the survivor, such as a doll, a suitcase, or a pair of shoes. In both the Israeli Holocaust museum Yad Vashem and the Bergen-Belsen concentration camp memorial, for example, "the video testimony and the object authenticated each other" (de Jong 2018: 242). In this case, it is the slow degeneration of the physical object that testifies to its authenticity. Limbless dolls or scrappy clothing tell stories of struggle, hiding, and risk. When viewed next to a survivor's recorded testimony, these objects — that will degrade less quickly than the features technology — hold the power to illustrate Nazi atrocities and make personal stories more relatable to museumgoers.

The question of authenticity invoked by de Jong is complicated by growing anti-Semitism and Holocaust denial (Diaz 2020, Griffin 2020). It has long been debated what constitutes proof of the systemic extermination of over six million Jews by the Nazis. Is it archival photos such as the four photos taken by Jewish members of the *Sonderkommando* in Auschwitz in 1944? Video recordings such as the 55,000 testimonies archived by USC Shoah Foundation's Visual History Archive or those seen in Claude Lanzmann's monumental *Shoah* (1985)? Legal documentation of atrocities and war crimes collected during the Nuremberg trials? Court testimonies during the 1961 Eichmann trial? Physical objects that can help historians recreate the lives of Jewish families in pre-war Europe or the nightmarish existence in the camps? All of these artifacts risk being destroyed or contested and their authenticity can always be questioned. Furthermore, they all fail to capture the real horrors of the Holocaust. Examining the post-war liberation films produced in 1945 by American filmmakers like Billy Wilder or George Stevens, Hannah Arendt warned:

> All pictures of concentration camps are misleading insofar as they show the camps in their last stages, at the moment the Allied troops marched in. [...] What gives the films their special horror — namely the sight of the human skeleton — was not at all typical for the German concentration camps; extermination was handled systematically by gas, not by starvation (1958: 446).

The multiple meanings of obsolescence should thus be traced back to the Nazi attempt to render the European Jewry obsolete in a way that would leave no trace of their systemic extermination. The need to acknowledge loss and erasure in any retelling of the Holocaust germinated a plethora of creative approaches. Exploring the works of postgeneration artists and writers such as Art Spiegelman, W.G. Sebald, Eva Hoffman, and Susan Meiselas, Marianne Hirsch argues that, "As a form of counter-history,"memory" offered a means to account for the power structures animating forgetting, oblivion, and erasure and thus to engage in acts of repair and redress. It promised to propose forms of justice outside of the hegemonic structures of the strictly juridical, and to engage in advocacy and activism on behalf of individuals and groups whose lives and whose stories have not yet been thought" (2012: 16). More recently, this tension between the personal loss and the strategic destruction of documents and archives gave rise to the "counter-monument" architecture seeking to "challenge the very premise of the monument" by invoking emptiness or strategically damaging the urban terrain (Young 2000: 92). It also led art historian Georges Didi-Huberman to argue that it is precisely those rare, blurry photos shot by the *Sonderkommando* that can bring us closer to the suffering of Jewish prisoners in the Nazi concentration camps: "The question of images is at the heart of the great darkness of our time, the 'discontent of our civilization.' We must know how to look into images to see that of which they are survivors" (2008: 182).

The problem of Holocaust remembrance is therefore twofold, as it needs to account for the destruction of evidence enacted by the Nazi regime throughout the war and for the risk that whatever testimony given by those who survived might be deemed "incomprehensible, senseless, or unimaginable" (Didi-Huberman 2008: 6). However, Didi-Huberman stresses that the inherent difficulty of grasping the deadliness of the Nazi masterplan should not be conflated with the need to find new ways to achieve the difficult task of Holocaust memorialization. Simply saying that *Auschwitz* is "unrepresentable" might paradoxically relegate it to "an unknowing repetition of the Nazi *Arcanum* itself" (Didi-Huberman 2008: 26) rather than dismantle it.

7. Similar to Dimensions in Testimony, the UK National Holocaust Centre and Museum launched The Forever Project, aimed at turning survivors' testimonies into "life-sized digital projection[s] that will answer you from a vast set of pre-filmed replies." The project was launched in 2017 and accompanied by a crowd-sourcing campaign that emphasizes its urgency. For an overview of The Forever Project, see https://www.holocaust.org.uk/foreverproject1.

Still, "the intolerable image" (Rancière 2011) presents us with its own set of paradoxes, the first of which is that it forces the viewer to look away. For images of atrocities to produce a political effect, the viewer must be willing to incriminate herself in the structural exploitations they expose. As studied by Jacques Rancière, this is rarely the case. For a photo of a dead child killed by American soldiers in Vietnam to truly shock an American, for example, "the spectator must already be convinced that what it shows is American imperialism, not the madness in human being in general" (Rancière 2011: 85). Rancière goes on to develop a theory in which the viewer does not want to be convinced, and the witness does not want to speak. He focuses on a seminal scene from *Shoah* in which the former Treblinka hairdresser Abraham Bomba recounts the arrival and shearing of prisoners about to enter the gas chamber. As Bomba starts crying and his voice cracks, "the voice of the director urges him to continue: 'You must go on, Abe. You have to' " (Rancière 2011: 91). Echoing Felman and Laub's "crisis of witnessing" (1992), Rancière's analysis makes manifest the obsolescence of speech. This unwillingness to speak creates a tension between witness and listener, one of credibility. To render Bomba's testimony legible for future generations, it must first be verbalized and then recorded, edited, and distributed by Lanzmann.

What Didi-Huberman, Lanzmann, Arendt, and Rancière tend to neglect is the obsolescence not only of the humans who bear the memory of the Holocaust, but also of the technologies employed to immortalize their stories. While *Shoah* has been digitized and made available on many digital platforms, including YouTube, only a small fraction of the testimonies collected over decades on VHS are accessible online. In the case of the USC Visual History Archive, for example, only 4,000 out of 55,000 testimonies can be streamed. Even when digitized, these hour-long testimonies are less and less likely to find engaged audiences in an attention economy fetishizing immersive experiences, viral clips, and personalization. Instead of the "unrepresentable," therefore, I suggest the concept of *compatibility* in order to reframe the most recent attempts to reinvent Holocaust remembrance. As used in Software Studies, compatibility is the capacity for two systems or applications to work together without having to be altered. Compatible software applications use the same data formats. The use of VR and 3D projection, as I demonstrate below, asks Holocaust survivors to be compatible with changing notions of storytelling and immersion as a corrective to the obsolescence of their bodies and memories.

The desire to become compatible with changing aesthetics and platforms replaced the representational turn in Holocaust Studies with a "mass production and consumption" of traumatic memory (Young 2000: 94). The question is no longer whether the Holocaust can be represented, but rather how best to employ new technologies to teach future generations about the dangers of fascism. Thus, recent Holocaust commemorations have included video games, mobile apps, and an Instagram story recreating Anne Frank's diary (Parker 2016, Reich 2020, Scharf and Horowitz 2019), to name but few examples. While many of these works enjoyed a favorable reception and reached millions, they all share the risk of gamifying the trauma. At the most extreme end of this slippery slope was an ill-fated attempt by the Babyn Yar Holocaust Memorial Center in Kyiv, Ukraine, to employ algorithms in order to "assign each visitor to one of multiple categories, including executioners, collaborators or victims, and tailor their experience accordingly" (Kramer and Varenikova 2020). This would be followed by a VR-based re-enactment of various experiences related to the assigned role, including prisoners of war who had to burn corpses. Following a public outcry and the resignation of several board members after the exhibition design was unveiled, this controversial attempt was shelved. Still, the risk of producing "a Holocaust Disney" (Kramer and Varenikova 2020) remains.

The *compatible narratives* explored below, however, are more complex and productive attempts to collaborate with survivors. They recast testimonies as a multi-sensory experience involving either 3D digital projections or a user-controlled interface inviting users to explore a room-scale VR on their own pace. By closely looking at two USC Shoah Foundation projects featuring a Holocaust survivor named Pinchas Gutter, I unpack the "moral affordances" (Frosh 2016) of these technologies and challenge their premise of immortality.

3 Survivor Holograms and the Allure of Responsiveness

The Dimensions in Testimony project aims to create 3D projections of holocaust survivors such as Eva Schloss and the 85-year-old Gutter. In a promotional video, Stephen Smith, the executive director of USC Shoah Foundation, explains, "We're almost out of time to have deep conversations with Holocaust survivors. If we

don't have these conversations now they will never take place."[8] The responsive projections are tasked with recreating the experience of a real-time dialogue for future generations.

While DT avoids using the term "survivor hologram," it is precisely this cultural fantasy that earned the project its worldwide coverage. A small digression into the decade-long history of the hologram is therefore needed. Coined two years after the Holocaust by Hungarian engineer Dennis Gabor, the term "hologram" was originally used to describe any three-dimensional image. It became popular in the 1970s and 1980s through reflective magazine covers or glass plates depicting fine art. Often used for erotica, the hologram was not initially thought of as an educational tool. This potential was discovered by Soviet museum curators who sponsored holograms of national treasures that could be transported by bus to remote villages across the Soviet Union throughout the 1970s (Johnston 2008: 225). A 1973 Rolling Stone article described the hologram as a futuristic extension of the photograph and mused that the hologram is likely "to push your subliminal awe and wonder button and leave an ancient message flashing somewhere below the surface of consciousness" (Johnston 2008: 224). In short, it was a "powerful magic" (ibid).

In what many Holocaust survivors describe as nothing less than magic, the DT uses natural-language processing algorithms to match real-time questions with pre-recorded answers. In the case of Gutter, for example, his holographic rendition tells students how he barely survived five concentration camps and a death march from Germany to Czechoslovakia. In an interview I held with him during the 2017 Tribeca Film Festival, Gutter explained that algorithmic-based holograms and VR are more effective ways to share his story with wide audiences than traditional documentation techniques:

> The first film I watched about the Holocaust was *Schindler's List*, which I thought was excellent. I saw other Holocaust films that moved me, but then — a couple of days later — they flew out of my head. Yet people who have heard my story personally tell me they will always remember me and this encounter changed them. I feel that through these works I can transmit my empathy and feelings and create a direct bond. Once you spend some time with someone, you won't forget them (Alexander 2017a).

Gutter's notion of immortality is twofold: The hologram will keep his memories alive after he dies, and the personal encounter this new technology enables will ensure that the retelling will forever stay in the minds of those who interact with it. This is achieved in part by using a technique called "light field rendering" that produces the three-dimensional projection. Unlike stereoscopic 3D projection, which requires the viewer to wear tinted glasses, the DT hologram can be viewed from different angles and without the need for accessories. As summarized by Amit Pinchevski, "No effort was spared to render the witness not only responsive but also virtually present at the scene of interaction" (2019: 93).

Co-presence or "co-witnessing," however, does not guarantee an empathetic response or a deeper understanding of traumatic events (Nash 2018). Gutter's hopeful description of the unique power of immersive technologies does not recognize the complex and sometime contradictory relationship between witnessing, empathy, and social change. As Kate Nash, Pooja Rangan, Lisa Nakamura and others have argued (2018, 2018, 2020), humanitarian artworks often produce indifference or hopelessness. As we will later see, embodied narratives such as the ones offered by VR might give rise to "identity tourism" produced, marketed, and consumed by mostly white, able-bodied users (Nakamura 2020). Even when the mediated encounter between a user and a survivor produces empathy — a notoriously contested, and not always desired, concept (Bloom 2016) — it is rare that humanitarian art projects lead to collective action, especially if the depicted trauma is seen as a relic of a distant past.

There are several other unacknowledged tensions in the DT project. First, while the digital projections will endure much longer than the physical bodies of the survivors, it paradoxically transforms the witness into an object. His or her testimony is authenticated not by the presence of a physical object like a neckless or a doll, but by the projected image and voice of the survivor. This reproduces the logic of "the era of the witness" that started with the Eichmann trial, when "remembering individuals were turned into legitimate carriers of cultural memory and legitimate historiographical sources" (de Jong 2018: 246). Yet, the holographic renderings create

8. The video is available on https://www.youtube.com/watch?v=nGzAc9mIoTM.

a conversation not between a student and a survivor, but rather between a user and an algorithm. It is the speech-recognition algorithm that is tasked with identifying key words in a user's question and searching the archive for the pre-recorded answer deemed most suitable. This process raises ethical questions that further complicate the idea of the witness as an historiographical source. For the conversation to appear authentically life-like, the algorithms involved must recognize verbal fluency for both the questions and the answers. As a growing number of studies demonstrate, however, speech-recognition algorithms "work best for white, highly educated, upper-middle class Americans" and their use can therefore "extend the application of bias" (Carter and Egliston 2020). Embracing the logic of technological progress, a project aimed at fighting xenophobia and anti-Semitism unwittingly markets itself through its innovative employment of technologies known to be biased and exclusionary.

Secondly, the survivor holograms, which are solely available in Holocaust museums or other educational settings, require not only verbal fluency, but also a degree of media literacy and historical knowledge. For this process to be productive, the person posing the question must be familiar with historical facts such as the names of concentration camps, the Nazi ideology, or the progression of World War II. It is this context (or lack thereof) that can determine whether the encounter will germinate a deeper understanding of fascism or will "rehearse neoliberal shifts in humanitarian communication in which individual feeling becomes the focus for intervention rather than structural inequalities or potential exclusions" (Nash 2018: 21). This danger might be mitigated, yet not entirely eliminated, by the decision to screen a short film about each survivor before museumgoers converse with his or her hologram. Still, the conversational setting and the thrill of a new interactive technology are designed to excite and induce emotive and visceral, rather than contemplative, reactions. This is also demonstrated by the recording of answers to questions such as "What was the most emotional moment you remember from the concentration camp?"

Thirdly, the archive created over twenty hours of interviews with each survivor (usually conducted on the Light Stage during the course of a single week) is limited and heavily curated. As Paul Frosh warns, this approach might paradoxically transform an individual story into a universal moral tale:

> Gutter's testimony is structured in advance as a series of answers to questions, many of them generic crowd-sourced queries to 'any' Holocaust witness [...] The holographic encounter defines the survivor's testimony as a 'cut and paste' arrangement of discrete statement-units. These are reconfigured by recognition and response algorithms according to the vocal and linguistic triggers of audience members, without regard to the statements' original ordering within the survivor's subjective experience and verbal expression (2016: 363).

The desire to create an experience more compatible with changing notions of students' interests and attention spans can therefore lead to a more fragmentary and, as Frosh term it, "hollow" encounter. For him, "the illusion is not just optically hollow, but ontologically and psychologically so," since it replaces a real-life encounter with the other with easily digestible fragments of horror and survival (Frosh 2016: 363). Frosh's critique is helpful in emphasizing what might be lost: the tactile encounter with the witness, moments of silence and repetitions crucial for a deep understanding of trauma, and an engagement with a coherent narrative providing historical context through a retelling of the war progression. This question of the different pacing and unfolding of narrative, which might become faster when automated, is important in that it strays from what an experience with a survivor can be like.

Drawing on Frosh's analysis, I wish to return to the promise of immortality embedded in the marketing materials of DT. In a promotional one-sheet, the creative team behind DT explains that, "Words such as 'hologram' and 'avatar' fail to accurately describe Dimensions in Testimony. We avoid using these terms because to date the technology to display a hologram does not exist, and 'avatar' implies that the image is animated or is somehow unreal."[9] The ambitious task at hand is therefore to render survivors compatible with *yet-to-exist technologies*. Much like the need to prerecord the phrase "Maybe you should try to reboot," this one-sheet reminds us the creators are aware of the potential obsolescence of the state-of-the-art technologies used to construct the 3D projections. The hope is that future, more advanced, technologies will animate the archive of answers in ways that did not exist when the survivors were still capable of telling their stories. Again, however,

9. See https://sfi.usc.edu/dit.

this does not take notice of the fact that the more sophisticated a technological format is, the less compatible it tends to be with older formats and interfaces. In the case of the survivor hologram, any new technology will have to accommodate the original recordings' audio compression format, 4k resolution, speech-recognition algorithms and accompanying set of hardware (screen, speakers, Wi-Fi connectivity).

Finally, DT ignores the tension between the fascination with a new technology and the desire to promote a meaningful dialogue with the bearer of historical trauma. As long as the holographic rendering enjoys the status of a new, magical technology, it will tend to draw attention away from the words uttered by the survivors and their affective and ethical potential. Then, when the technology is more ubiquitous and is no longer a gimmick, students and museumgoers may lose interest in the fragmented testimony that requires many hours to watch in its entirety. In short, a speculative future in which holographic renderings are as ubiquitous as smartphones does not necessarily immortalize survivors; instead, it could extend their compatibility for several years or decades until a new gimmick comes along.

I use the term "gimmick" to denote an aesthetic form associated by Sianne Ngai with industrial capitalism. In her recent theorization of the gimmick as a cultural form, she attends to its contradictory temporal states: "At higher levels, expensive new technology adopted too early might be described as working too well, performing above standard, but unprofitably" (Ngai 2020: 475). This desynchronization with "the times" results in a "compromised aesthetic form: that of seeming either too old or too new," while "it aggressively insists on its contemporaneity with its audience" (ibid). The hologram, described by its creators as a "time-offset interaction," is used to simulate an interactive, synchronous conversation "through the fourth dimension of time" (Pinchevski 2019: 92). The result is "too new" to be experienced outside a customized museum setting. Once its newness will be deemed by the glow of more innovative technologies, the 3D projection risks being transformed from a gimmick to a system of display not easily compatible with newer formats.

4 *The Last Goodbye*: Walking Barefoot through Majdanek

If the appeal of DT is the responsiveness afforded by speech-recognition algorithms, *The Last Goodbye* partakes in the reinvention of Holocaust remembrance by constructing an embodied, multi-sensory guided tour of a concentration camp. Mainly shot in Majdanek, a Nazi concentration and extermination camp built and operated by the SS on the outskirts of the city of Lublin during the German occupation of Poland, the 16-minute VR work invites participants to walk through the camp alongside Pinchas Gutter. Unlike Gutter's hologram, the display of which is limited to educational settings, *The Last Goodbye* premiered at the Virtual Arcade of the 2017 Tribeca Film Festival and later was presented at the Venice Film Festival. It thus lacks the historical context afforded by a Holocaust museum, and instead it competes for the viewer's attention as part of a "virtuous VR" industry including humanitarian works on refugee camps, natural disasters, and police brutality (Nakamura 2020). As such, it requires the user to remove her shoes when entering a dedicated area in which she is invited to put on the Oculus headset.

With its unique ability to both create room-scale environments and react to the user's movement in real time, VR potentially "converts sensorimotor responsiveness into moral responsibility" (Frosh 2016: 351). At best, this technology affords a multisensory simulation that "is qualitatively different from cinematic sympathy" since it perpetuates an "unprecedented perceptual proximity" (Raz 2019: 1005). Employing neuroscience, Gal Raz argues that "VR may induce multi-level unconscious psychological transformations, which may sustain after the experience is over" (2019: 1011). This argument promotes an understanding of VR as a technology with unique "moral affordances," while echoing the ideology of connectivity as a means to achieve a lasting effect.

However, this sense of "response-ability" (Tait 2011) to the suffering of others is contested by a growing number of media scholars (Nakamura 2020, Nash 2018). Providing the user with a sense of safety and control, VR subjects even the most harrowing testimonies or re-embodiments of traumatic events to gamification, rendering them pleasurable (Bloom 2017). While some VR works have been proven to mitigate racial biases,[10] they risk conflating deep attention and learning with "slacktivism" (Morozov 2011) or, worse, "identity tourism" (Nakamura 2020). These critiques echo Saidiya Hartman's seminal question in *Scenes of Subjection*: "In order

10. For an overview of the literature on VR and racial bias, see Raz 2019: 1009-1013.

for suffering to induce a reaction and stir feelings, it must be brought close. [...] So, then, how does suffering elude or escape us in the very effort to bring it near" (1997: 20)?

In *The Last Goodbye*, suffering is immortalized and brought near by a multisensory technology. In a promotional video uploaded to YouTube, the technical processes receive significantly more screen time then the story told by Gutter.[11] Instead of the natural language processing used to create survivor holograms, this VR work was brought to life by "dozens of photogrammetry artists and engineers" who recreated Majdanek's crematorium and gas chambers in 360-degree room-scale. As the narrator explains, "The entire experience uses the most innovative technologies to enable viewers to walk with Gutter eye-to-eye as he revisits the railway car, the gas chamber, shower room, and barracks of Majdanek." The result is "the first-ever Holocaust survivor testimony in room-scale VR" and makes Gutter's story accessible "for generations to come."

Fully aware of the need to maintain a "proper distance" (Nash 2018) between the user and Gutter, *The Last Goodbye*'s co-creators, Gabo Arora and Ari Palitz, successfully negotiate many of the tensions described above. Unlike the holographic rendering of Gutter, for example, they incorporate the "crisis of witnessing" into the VR narrative. In what can be seen as a gesture to Bomba's moment of breakdown in *Shoah*, the work opens with a documentary segment in which the VR user is introduced to Gutter in a most unlikely place: a hotel bathroom where he shaves in front of a small mirror. This initial encounter immediately invokes a surprising sense of intimacy and vulnerability: the user is barefoot, while Gutter wears a knee-length white bathrobe. In a voice-over narration, Gutter confesses that he is extremely anxious about going back to Majdanek for what he describes as "my very last visit to the camp." This opening scene is a mirror image of the holographic projection depicting survivors with professional makeup and carefully chosen clothes. It not only functions as an exposition to Gutter's testimony, but it also allows the VR user a much-needed break before moving from the busy festival setting to a concentration camp. Gutter's hesitation also pushes against the idea that survivors are immortal and instead places them in the realm of anxiety, loss, and quotidian existence. This decision effectively shifts our attention from the "unconscious psychological transformations" attributed to VR by Raz to the "audiovisual unconscious" historically associated with survivor narratives captured on video. As studied by Pinchevski (2012), this "audiovisual unconscious" consists of the multiple silences, slippages, tics, and repetitions — in short, moments of transgression mostly eliminated from Gutter's hologram, yet kept in *The Last Goodbye*.

Another creative decision that proves crucial to incorporating the tensions inherent to mediated testimonies is the recreation of Majdanek's crematorium, where more than 60,000 Jews were murdered. When Gutter approaches the room in which both his parents and his twin sister, Sabina, were murdered, he explains to the viewer that he cannot enter it, as "I shudder inside and fear takes over all my body." This moment creates a split between the witness and the viewer. While Gutter chooses to stay outside, the VR recreation enables the viewer, if she wishes, to enter the space and take a closer look. This is a physical and ethical junction forcing the viewer to ask herself to what extent anyone can truly understand the horrors faced by Holocaust survivors. Instead of an invitation to re-embody the other through VR pedagogy, with its problematic claim to create new knowledge through empathy, *The Last Goodbye* differentiates the survivor and the viewer in unmistakable ways.

On the other hand, this VR work, much like the hologram, is heavily invested in the logic of immortality achieved by technological reproduction. The final scene is not shot in Majdanek but rather in a tranquil European park, where Gutter plays with his grandson. His voice-over narration tells us, "I'm always hopeful for the future. I believe things will improve. I don't know if it will happen in my lifetime, but maybe in yours." This direct address to a future generation who might watch the work long after Gutter dies connects it to his faith in immersive technology. The irony is that VR works made with Oculus, such as *The Last Goodbye*, are not always compatible with other VR platforms, and they tend to stop working whenever a software update is being introduced.[12] Gutter's one last visit to Majdanek is thereby jeopardized by the precarious nature of the technology his testimony promotes.

11. The video is available on https://www.youtube.com/watch?v=rOgtLhHSjy0.

12. In its attempt to introduce "VR for the masses," Oculus released four different consumer VR headsets in the last decade. See https://www.theverge.com/2019/4/30/18523000/oculus-quest-review-vr-headset-price-specs-features.

Since 2019, *The Last Goodbye* can be watched in full on YouTube. However, without the VR headset and the user's ability to wander the space on their own, the work loses its interactivity. The digitization exacerbates the motion sickness associated with VR while denying the viewer the awe and wonder of an optical illusion and the excitement of a setting such as Tribeca's Virtual Arcade. Rather than immortalizing Gutter's story, its afterlife on YouTube makes it look outdated less than three years after the work was hailed as "striking and deeply emotional" and won two Webby awards (Boston 2018).

5 Conclusion

The forms of obsolescence explored in this essay should not be mistaken as an attack on immersive technologies and their potential to enact social change. Instead, my comparative reading of 3D projections and room-scale VR seeks to highlight what is too often missed: that the technologies themselves are subject to degradation and are designed to become incompatible with changing formats and new software, hardware, and compression algorithms. One possible solution to this paradox is to incorporate these tensions into the testimonies themselves in ways that point to the limitations and challenges of mediating trauma.

Much like *The Last Goodbye*, internet users can now watch Lanzmann's monumental *Shoah* on YouTube. Lanzmann's epic documentary begins with a quotation from Isaiah, "I will give them an everlasting name." Yet, its use of static interviews and hour-long testimonies is not compatible with the culture of newsfeed, meme and viral videos. Faced with digital born audiences, it may not stand the test of time.

What *Shoah* can still teach us, however, is that only those art forms that can incorporate a sense of reflexivity about the limits of representation are the most enduring. With its famous phantom ride through the empty barracks of Auschwitz, the film implies that our ability to fully comprehend the scale and impact of the Holocaust is limited. Only when the hologram starts flickering or buffering will we get a glimpse into the obsolescence not only of the technology itself, but also of the European Jewry whose memory it is trying to immortalize.

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