

An Online Memorial for Coping with Mass Shooting Tragedy by Combining Participatory Memory with Participatory Design of AI Use Cases

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ABSTRACT

Mass shootings occur in America at an alarming rate. There is opportunity to intervene in this problem by designing technologies that support affected communities in processing gun violence tragedy. In this paper we report on the design of an online memorial for a mass shooting that affected our university's local community. We demonstrate an alternative approach to online memorials that blends participatory memory with participatory design through remembrance artifacts that represent ideas for gun violence prevention technologies that could have prevented the tragedy and that may prevent future tragedies. We demonstrate participatory memory + design with our memorial called the OUrchive that supports retrospective and prospective reflection on the Oxford High School shooting through designing new use cases for AI to prevent mass shootings. Early community involvement suggests that the OUrchive supports personal reconciliation with tragedy by channeling trauma towards public discourse about potential solutions to gun violence.

CCS CONCEPTS

• **Human-centered computing** → **Participatory design.**

KEYWORDS

Mass shooting, gun violence, memorial, remembrance, participatory design, participatory memory

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1 INTRODUCTION

Mass shootings have become a normalized part of life in the United States. Between 2009 and 2020 over 2,000 people were killed or injured in mass shootings in the US; 362 were children [18]. One

shooting is particularly poignant to the authors of this paper. On November 30, 2021 four people were killed, and nine more injured, in a mass shooting at Oxford High School in Oakland County, Michigan. The high school is located 20 minutes from our university and many graduates from Oxford High School attend our university. Our community remains affected by the tragedy, with daily reminders on banners, billboards, and business signage.

The field of HCI is no stranger to addressing social injustices [6, 23], and the Oxford High School shooting has spurred us to reflect on the role that HCI research could play in addressing mass shootings. Gun violence is a wicked problem [19] with many potential solutions each reflective of the many different factors contributing to its occurrence [5]. Gun control legislation is perhaps the most discussed solution approach [13]. As HCI researchers we also consider the role that technology could play in tandem with socio political initiatives, not least because computer-mediated communication has already played a role in several mass shootings. For example, the perpetrator in a racially motivated mass shooting in Buffalo, New York used Discord and Reddit to air his plans and discuss tactical gear that would deflect gunfire from security guards and allow him to continue his mass murder [24]. The perpetrator in the Oxford High School shooting posted several concerning signs on social media, including a picture on Instagram of the gun later used in the tragedy and the quote “Now I become death – destroyer of worlds – see you tomorrow Oxford” [17].

The literature elucidates two roles that technology can play regarding mass shootings: technology for prevention of harm and technology for supporting affected communities in processing a mass shooting tragedy. Solutions for harm prevention include AI to search and flag content posted online that could be indicative of a potential shooter [21] and AI-driven IoT devices to direct individuals to the safest exit should a mass shooting occur [8]. Others help bystanders to avoid or minimize victimization such as VR simulations to train teachers for school shooting situations [10].

Technology can also be used to help a community process and reflect on mass shooting trauma, which we have taken a personal interest in following the Oxford High School shooting. Alvarez et al. [1] discuss online memorials as tools to support communities following a mass shooting tragedy, including a landscape analysis of design choices to inform creation of their own online memorial for the Marjory Stoneman Douglas High School mass shooting. Samuels et al. [20] report on the National Youth Art Movement Against Gun Violence (NYAM) project, which empowered Chicago youth to create Augmented Reality artwork that “unpacks the deeply layered ways in which [gun] violence affects living in

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Chicago.” Tangentially related work has also explored social support and healing through online communities [7, 22].

Online memorials facilitate participatory memory [12], or the act of healing and processing of tragedy through collective “making, creating, crafting” [1]. While considering the creation of an online memorial for our Oakland community we personally struggled with the supposed efficacy of participatory memory in light of the startling frequency of mass shootings. For example, another mass shooting occurred in the time we wrote this paper in Uvalde, Texas that resulted in 21 deaths. How can we process a tragedy that is perpetually on the cusp of re-occurrence?

In this paper we share an alternative approach to online memorial construction that blends elements of participatory memory [12] with participatory design [16], and entails memorializing through artifacts representing the design of new technologies that could have prevented the respective mass shooting and could prevent future acts of gun violence. Design artifacts that comprise the memorial thus utilize trauma to add to public discourse about potential solutions to gun violence.

In the following sections we report on the design and use of our memorial called the OURchive (named in reference to Oakland University), which supports Oakland community members in participatory memory of the Oxford High School shooting through participatory design of new AI use cases for mass shooting prevention. Stakeholders’ contributions to the OURchive tended to involve retrospective AI-driven solutions that would have targeted specific moments for prevention of the Oxford High School shooting that became clear in the wake of the tragedy. They had positive experiences with OURchive artifact generation and review of others’ artifacts because it enabled a constructive unpacking of loss that may inform future harm prevention technologies, even though the proposed AI-based solutions were not advocated for literal development and deployment.

2 ORIGIN OF THE OURCHIVE

Construction of the OURchive has been led by five students in Oakland University’s Department of Computer Science and Engineering. The first author is one of those students, and the second is a faculty advisor who supervised the students in their efforts to design and deploy the OURchive amongst the Oakland community.

When planning the construction on an online memorial for the Oxford High School shooting we first explored designs of other online memorials [1]. Remembrance artifacts traditionally comprise photos, letters, and cards that express sympathy for victims and personal stories related to the tragedy. We opted not to follow this standard approach in resistance to the normalization of mass shootings and the increasingly glaring absence of interventions that precede and prevent gun violence. We instead approached remembrance as an exercise in prospective reflection that contributes to growing demands for preventative action through ideas for new prevention technologies borne out of personal trauma. In essence we sought to combine the retrospective merits of participatory memory [1, 12] that are typical of online memorials with the prospective merits of participatory design [16] to expand the utility of remembrance.

Our team engaged in a personal practice of participatory memory + design to contribute the initial remembrance artifact to the

OURchive and reflect further on what form remembrance artifacts could take for the broader Oakland community. We found ourselves drawn to artificial intelligence (AI) as a design material for a few reasons. One, AI plays a central role in currently available school shooting prevention solutions [8, 21] and we saw our personal contribution to the OURchive as a way to inform or add to a growing body of technologies that can preempt school shootings at scale. We were also inspired by efforts within HCI and related research to use AI as a speculative design material [15] and to advocate for democratization of AI in all facets of life [14, 25, 26]. Our own remembrance artifact for the OURchive culminated in the “Instagram gun scanner” – an AI-driven application to detect pictures of guns posted on Instagram by high school and university students and alert school counselors and other applicable authorities so they can determine whether to investigate. There are severe shortcomings of Instagram gun scanner as a literal solution to gun violence in regards to potential racial bias [2, 3, 9] and surveillance capitalism [11], and we do not advocate for its implementation as-is. Nonetheless, we found the process of ideation helpful for personally coping with and processing the Oxford shooting because it enabled us to unpack—and draw attention to—structural shortcomings that should be corrected to prevent future shootings, specifically the unawareness by responsible parties of the shooter’s social media posts that in retrospect were alarming clues of intent to commit a mass shooting [17].

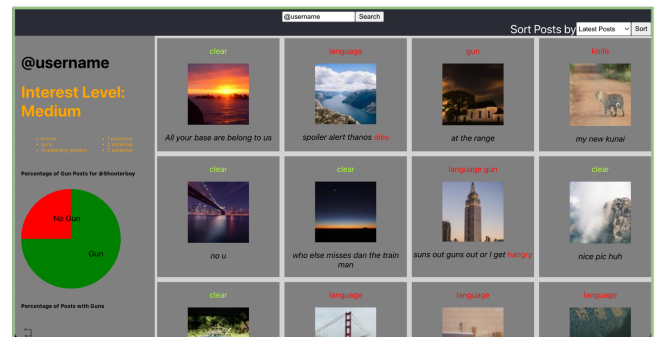


Figure 1: The first contribution to the OURchive was our own, called the Instagram gun scanner. Its creation helped our coping and reflection of the Oxford mass shooting by enabling us to elucidate stakeholders that should have been empowered to intervene.

3 INVOLVING THE OAKLAND COMMUNITY IN DESIGN AND USE OF THE OURCHIVE

Following our development of Instagram gun scanner as the initial remembrance artifact for the OURchive we solicited involvement from Oakland community stakeholders through focus groups to produce their own remembrance artifacts and inform design of the OURchive interface. Interactions with community stakeholders sought to: 1) validate whether AI was similarly valued as a speculative design material for remembrance artifacts (especially by community members with no AI background), 2) inform design of the OURchive interface that would eventually support contribution

of remembrance artifacts and public review of others’ artifacts without researcher involvement, and 3) assess whether the process of designing and reviewing other community members’ remembrance artifacts was indeed helpful for personally reflecting and coping with the Oxford mass shooting.

A total of 23 Oakland community members have contributed to the OURchive so far. These include 16 university students, 2 parents of university and high school students, 2 university alumni, 1 professor, 1 police officer, and 1 high school superintendent. They were recruited through posts to university mailing lists and word-of-mouth campaigns amongst the Oakland community. The protocol for focus groups started with a review of the Oxford High School shooting and open dialogue amongst participating community members about the event. We then introduced the concept of the OURchive and provided our own remembrance artifact (the Instagram gun scanner) as an example. In subsequent sessions community members also reviewed remembrance artifacts created by earlier participants. We used these prior remembrance artifacts to introduce (but not require) AI as a possible speculative design material for participants’ own remembrance artifacts. In response to earlier participants requesting more information about AI to help their brainstorming for remembrance artifacts, in later sessions we included short AI tutorials through Powerpoint presentations that covered basic AI terminology and popular implementations of AI that participants may recognize.

3.1 Design of the OURchive Interface

The OURchive interface was gradually developed across focus groups to accommodate expected functionality for viewing others’ remembrance artifacts (participatory memory) and for creating one’s own artifact (participatory design). The participatory memory component of the OURchive enables community members to freely browse entries, similar to how online memorials for other school shootings have been constructed (e.g., [4]). Participating community members have found review of previously-submitted artifacts to be helpful for brainstorming and inspiration, and so we have also incorporated sorting and search functionality in anticipation of a growing repository of remembrance artifacts.

The participatory design component of OURchive does not explicitly require stakeholders to produce AI-based solutions to gun violence, although all of our stakeholders so far produced AI-based design ideas because they found the nature of automation compelling and directly applicable to various aspects of the Oxford High School shooting. The most valuable tools for supporting stakeholders in generating their own AI-based design artifacts proved to be the visibility of previously created artifacts as examples; AI tutorials and educational materials used in focus group sessions are not directly embedded in the OURchive interface, nor is AI explicitly mentioned in the interface other than in stakeholders’ own remembrance artifacts.

Remembrance artifacts submitted to the OURchive take the form of answers to four prompts: 1) The purpose of the proposed solution: users can provide a text description of their proposed gun violence prevention technology and upload sketches that depict a scenario of use or an interface mockup. 2) Target users of the technology: clarification of who would use the technology and how.

3) The “why” behind their proposed technology: this gives community members the opportunity to draw attention to the antecedents of mass shootings that they wish would be addressed in future technologies. Participants often considered this element to be more important than the proposed design itself because it could inspire superior technical solutions from others (e.g., industry practitioners) that better address the same underlying issues or pursue the same underlying vision of safety. 4) The values underpinning their proposed technology: this comprises abstract principles that stakeholders want foregrounded in design. These were often expressed as value tradeoffs such as valuing faster detection of potential school shooters at the expense of reduced privacy.

3.2 Use of the OURchive

Participating community members found the process of creating remembrance artifacts for the OURchive to be personally beneficial for reflecting on, and coping with, the Oxford shooting. For some the process enabled them to unpack the experience in ways they were not previously able to do, particularly for identifying lingering effects of the shooting on themselves and their community. For instance, while reviewing design artifacts submitted by other community members one student stakeholder acknowledged that “places that should be safe still aren’t safe” and another exclaimed that the shooting was “unacceptable” in light of missed signals of the shooter’s intent that were emphasized in others’ design artifacts.

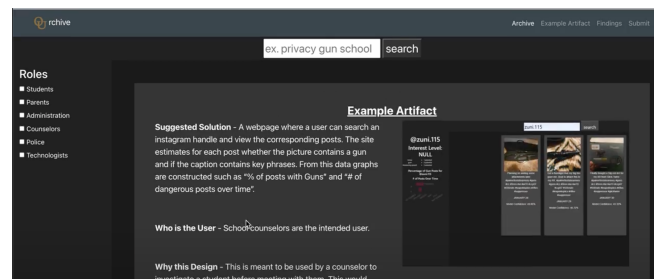


Figure 2: The OURchive supports design entries as a combination of digital sketches and text. On the left-hand side of the screen is an early iteration of design sorting based on intended users or beneficiaries of the proposed technologies.

Remembrance through design was used to channel stakeholders’ frustration about the shooting by constructively envisioning a past (and therefore a potential future) in which the antecedents of a mass shooting are better addressed. For example, one community member pondered out loud why the shooter was motivated to cause harm: “one specific thing wouldn’t make a student crack, it’s built up anger.” Accordingly, some stakeholders created remembrance artifacts that highlighted ways that technology could support “lifestyle improvements” and mental health. The process of designing remembrance artifacts also caused stakeholders to openly reflect on shifting values in light of the tragedy. Several acknowledged a new willingness to reduce their own privacy during social media use as a way to help identify potential shooters and provide them with mental health support. A university police officer involved in our sessions was actually the most adamant about maintaining privacy

of students' social media accounts. While producing their own design they remarked repeatedly about "the 4th amendment" and were openly critical of prior solutions, including one that the police department had previously purchased, for reviewing social media profiles. Their resultant artifact was a flow diagram for social media scanning that foregrounds student privacy.

4 CONCLUSION AND FUTURE WORK

We propose an alternative approach to online memorials that uses memorializing as an opportunity for design and collective reflection towards preventative solutions to gun violence. While early community participation has been positive, there are still open challenges to our memorial's design. In particular, we still find researcher presence during online memorial-use to be crucial to help community members with little technical knowledge to contribute design ideas. There are also open questions as to how best to make the online memorial useful to industry practitioners. Our ongoing work involves recurrent design sessions with a diverse range of stakeholders to improve the design of the online memorial towards a state that enables community members to independently contribute design artifacts.

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REFERENCES

- [1] Alina Alvarez, Liza Potts, and Laura Gonzales. 2021. Researching Digital Interfaces to Raise Awareness about the Impacts of Gun Violence: A Landscape Analysis Experience Report. In *The 39th ACM International Conference on Design of Communication*. 277–280.
- [2] Ruha Benjamin. 2019. Race after technology: Abolitionist tools for the new jim code. *Social forces* (2019).
- [3] John Cheney-Lippold. 2017. We are data. In *We Are Data*. New York University Press.
- [4] VT Special Collections and University Archives Online. 2022. *Unknown Origin: Anonymous gifts in the April 16, 2007 Condolence Archives*. <https://digitalsc.lib.vt.edu/exhibits/show/unknown-origin-april16/introduction>
- [5] Jeffrey A Daniels, Adam Volungis, Erin Pshenishny, Punita Gandhi, Amy Winkler, Daniel P Cramer, and Mary C Bradley. 2010. A qualitative investigation of averted school shooting rampages. *The Counseling Psychologist* 38, 1 (2010), 69–95.
- [6] Lynn Dombrowski, Ellie Harmon, and Sarah Fox. 2016. Social justice-oriented interaction design: Outlining key design strategies and commitments. In *Proceedings of the 2016 ACM Conference on Designing Interactive Systems*. 656–671.
- [7] Katie Z Gach and Jed R Brubaker. 2021. Getting Your Facebook Affairs in Order: User Expectations in Post-mortem Profile Management. *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW1 (2021), 1–29.
- [8] Irena Gao. 2016. Using the social network internet of things to mitigate public mass shootings. In *2016 IEEE 2nd International Conference on Collaboration and Internet Computing (CIC)*. IEEE, 486–489.
- [9] Timnit Gebru, Jamie Morgenstern, Briana Vecchione, Jennifer Wortman Vaughan, Hanna Wallach, Hal Daumé III, and Kate Crawford. 2021. Datasheets for datasets. *Commun. ACM* 64, 12 (2021), 86–92.
- [10] Tami Griffith, Jennie Ablanedo, and Tabitha Dwyer. 2017. Leveraging a virtual environment to prepare for school shootings. In *International Conference on Virtual, Augmented and Mixed Reality*. Springer, 325–338.
- [11] Blayne Haggart. 2019. The age of surveillance capitalism: The fight for a human future at the new frontier of power. S. Zuboff (2018). *Journal of Digital Media & Policy* 10, 2 (2019), 229–243.
- [12] Asnath Paula Kambunga, Heike Winschiers-Theophilus, and Rachel Charlotte Smith. 2020. Participatory Memory Making: Creating Postcolonial Dialogic Engagements with Namibian Youth. In *Proceedings of the 2020 ACM Designing Interactive Systems Conference*. 785–797.
- [13] Ik-Whan G Kwon and Daniel W Baack. 2005. The effectiveness of legislation controlling gun usage: a holistic measure of gun control legislation. *American Journal of Economics and Sociology* 64, 2 (2005), 533–547.
- [14] Min Kyung Lee, Daniel Kusbit, Anson Kahng, Ji Tae Kim, Xinran Yuan, Allissa Chan, Daniel See, Ritesh Noothigattu, Siheon Lee, Alexandros Psomas, et al. 2019. WeBuildAI: Participatory framework for algorithmic governance. *Proceedings of the ACM on Human-Computer Interaction* 3, CSCW (2019), 1–35.
- [15] Michael Muller and Q Vera Liao. 2017. Exploring AI Ethics and Values through Participatory Design Fictions. *Human Computer Interaction Consortium* (2017).
- [16] Michael J Muller. 2007. *Participatory design: the third space in HCI*. CRC press.
- [17] Nathan Place. 2021. Michigan suspect posted ominous messages before shooting, reports say. <https://www.independent.co.uk/news/world/americas/crime/michigan-shooting-suspect-become-death-b1968045.html>
- [18] Everytown Research Policy. 2022. *Mass Shootings in America*. <https://everytownresearch.org/maps/mass-shootings-in-america/>
- [19] Horst W Rittel and Melvin M Webber. 1974. Wicked problems. *Man-made Futures* 26, 1 (1974), 272–280.
- [20] Janice Tisha Samuels, Anijo P Mathew, Chantala Kommanivanh, Daniel Kwon, Liz Gomez, B'Rael Ali Thunder, Daria Velazquez, Millie Martinez, and Leah LaQueens. 2018. Art, human computer interaction, and shared experiences: A gun violence prevention intervention. In *Extended Abstracts of the 2018 CHI Conference on Human Factors in Computing Systems*. 1–4.
- [21] Alexander Semenov, Jari Veijalainen, and Jorma Kyppö. 2010. Analysing the presence of school-shooting related communities at social media sites. *Int. J. Multimed. Intell. Secur.* 1, 3 (2010), 232–268.
- [22] C Estelle Smith, Avleen Kaur, Katie Z Gach, Loren Terveen, Mary Jo Kreitzer, and Susan O'Conner-Von. 2021. What is Spiritual Support and How Might It Impact the Design of Online Communities? *Proceedings of the ACM on Human-Computer Interaction* 5, CSCW1 (2021), 1–42.
- [23] Angelika Strohmayr, Jenn Clamen, and Mary Laing. 2019. Technologies for social justice: Lessons from sex workers on the front lines. In *Proceedings of the 2019 CHI conference on human factors in computing systems*. 1–14.
- [24] Jon Swaine and Reed Albergotti. 2022. Just before Buffalo shooting, 15 users signed into suspect's chatroom, says person familiar with review. <https://www.washingtonpost.com/investigations/2022/05/19/payton-gendron-discord-buffalo-shootings/>
- [25] Christine T Wolf, Haiyi Zhu, Julia Bullard, Min Kyung Lee, and Jed R Brubaker. 2018. The changing contours of "participation" in data-driven, algorithmic ecosystems: Challenges, tactics, and an agenda. In *Companion of the 2018 ACM Conference on Computer Supported Cooperative Work and Social Computing*. 377–384.
- [26] Douglas Zytko, Pamela J. Wisniewski, Shion Guha, Eric PS Baumer, and Min Kyung Lee. 2022. Participatory Design of AI Systems: Opportunities and Challenges Across Diverse Users, Relationships, and Application Domains. In *CHI Conference on Human Factors in Computing Systems Extended Abstracts*. 1–4.