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Open Forum

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AI and Archives: How can Technology Help Preserve Holocaust Heritage Under the Risk of Disappearance?

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On 24 February 2022, Russia launched its full-scale invasion of Ukraine, a resumption and an expansion of a conflict that had begun with an incursion into eastern Ukraine and Crimea in 2014. In addition to the massive loss of lives and destruction of civilian infrastructure, the invasion was accompanied by an intensive propaganda campaign which distorted historical facts to stigmatize and demonize Ukrainians resisting the invasion (Ferraro 2023; US Dept. of State 2023). One common target of such distortion concerned memories about the Holocaust in Ukraine, which were instrumentalized by the Kremlin officials and pro-regime activists to present Ukrainians as the main perpetrators of the Holocaust and other Nazi crimes (e.g., Meduza 2023; Smart 2022).

The dangers of propaganda-driven rewriting of the Holocaust history by the Kremlin are amplified by the risks of the physical destruction of Holocaust heritage in Ukraine. An attack against a TV tower in Kyiv in the early months of the invasion gained notoriety because of the proximity of the attack to the Babyn Yar memorial located nearby (Forensic Architecture 2022), although the memorial remained mostly intact in this case. However, a Holocaust memorial in Drobytsky Yar was damaged by the Russian shelling soon after (Lonas 2022). Multiple strikes against the Ukrainian educational centers (Dearen, Juliet, and Stashevsky 2022; Jerusalem Post

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Staff 2023) as well as the destruction of memorials in the Russia-occupied territories (Gabowitsch 2023) further illustrate that historical memory is at risk during this war.

The conventional means of preserving heritage at risk is to create an archive whereby the documents and items can be secured and cared for. While this practice has long been the protocol in these cases, changes brought on by the digital turn have added new layers of complexity in heritage preservation. There is an ontological shift in the understanding of what is meant by the heritage collections in the age of digitalization (Karp 2014; Thwaites 2013; Zucker et al. forthcoming). Alongside the iconic elements of Holocaust heritage, such as museums, memorial and video archives, stand instances of online atrocity memorialization produced through digital technologies (Bultmann et al. 2022; Simon and Zucker 2020). Archival efforts to capture the flow and the varying expressions of Holocaust memorialization pertaining to Ukraine, must now extend beyond the physical and digital collections of established Holocaust institutions to include a diverse range of materials produced by independent initiatives, published in a variety of internet media ranging from dedicated websites to posts on social media. These materials vary from audiovisual reflections on the Holocaust on YouTube (Makhortykh 2019), to narratives emerging from collective history-writing on Wikipedia (Pfanzelter 2015), to blogs (Stevens and Brown 2011), and to mini-archives on Pinterest (Činátl and Pyýcha 2021).

The first challenge of the practical implementation of this task is that the material to be archived is plentiful, prolific, widespread, and even ephemeral (Makhortykh et al. 2023). Individual websites dedicated to the Holocaust in Ukraine can consist of thousands of web pages, often including not only textual but also audiovisual content. Moreover, multiple content items inhabit news sites and social media platforms such as Facebook, TikTok, or X. Collecting and storing this diverse and expansive range of content is essential for a number of reasons, including the importance of understanding which types of Holocaust-related content are uploaded and interacted with online, whether particular content is shared or uploaded in relation to particular events and/or to create specific narratives (Zucker et al. forthcoming), and how such content can be misused including desecration and alteration for the purposes of denial, artistic expression, or narrative construction for political or cultural purposes (Zucker forthcoming). However, to achieve these tasks, one must first have a means of identifying Holocaust-online content in the online environments so that it can be collected and archived.

Second, the increasing fluidity of digital matter adds new dimensions to materials that never existed in their analog forms (Ibrahim 2018; Makhortykh et al. 2023; Simon and Zucker 2020). For example, a photographic image may appear in a digitally altered state, including colorization, added text, and animation features (Zucker forthcoming). It may also be synthesized with other photos, embedded in video, potentially accompanied by audio, or even transformed into an internet

meme.[1] Consequently, there is a need for new tools to compare different features of the archived digital objects and, ideally, match them to the original to track potential use or misuse. Such functionality is particularly important considering the risks of deep fakes, which have already been used in the context of the Russian aggression against Ukraine. Most of these deep fakes have been focused so far on the present (e.g., Twomey et al. 2023), but, presently, there does not seem to be technological limitations that could prevent the emergence of historical deep fakes, considering the intense efforts of the Kremlin to vilify Ukrainians through distortionist propaganda and instrumental use of narratives about the past.

Finally, once the collection of content for a Holocaust-related online archive begins, an additional challenge arises in determining how to make content useable by researchers and the general public. The major challenge is how to help users of an archive navigate this wealth of data without getting lost in it, being overwhelmed, and being discouraged from the exploration (Zucker et al. forthcoming). To achieve these purposes, one must consider questions increasingly posed in archive usability research (e.g., Abrams et al. 2019; Walton 2017): *What type of interface would allow easy access and usage of digital archival collections? How to filter material in the archive to prevent unintended harm to its users and to individuals' information stored there? What features and tools should be included to motivate users to engage with archival materials and help them realize their epistemic goals?*

To ensure both the preservation of different forms of Ukrainian digital Holocaust heritage and the ability to make it available to present and future generations, a new form of archive is needed. It need not replace existing archival institutions in Ukraine and other parts of the world but, rather, would supplement them considering that many analog collections stored in the heritage institutions dealing with the Holocaust in Ukraine remain non-digitized. Specifically, it is necessary to consider how the recent rise of artificial intelligence (AI) technologies can influence archives of digital Holocaust heritage and how the above-mentioned challenges can be addressed with the help of these technologies.

Holocaust heritage institutions have been using AI systems for curating and processing their collections for quite some time (Arolsen Archives 2022; Carter et al. 2022). However, the advancements in the field of generative AI characterized by the advanced capacities for generating and processing content signify several important changes that are particularly relevant regarding the preservation of Holocaust heritage under the risk of disappearance. In addition to contributing to the growing amount of Holocaust-related content in online environments by generating it in

1 For some examples of such transformations, see Commane and Potton (2019) and González-Aguilar and Makhortykh (2022).

response to user prompts, generative AI models can also label, identify, and retrieve various types of content relevant to the Holocaust.[2]

AI is a powerful tool for analyzing large amounts of data, a feature that makes it ideal for handling the magnitude of Ukraine-related Holocaust content that exists online. It provides a means of addressing the first challenge identified above by allowing the mapping of online content. Three particularly important areas in the context of Holocaust heritage, where such analytical potential can be particularly relevant, concern the detection of sensitive content (i.e., content that raises privacy issues), denialist content, and manipulated or non-authentic Holocaust-related content. One example of the potential of AI in this context is the development of AI-based models capable of detecting abusive and offensive language (e.g., HateBERT; Caselli et al. 2021). Such models can be adapted to facilitate research in the context of mass atrocities, for instance, to analyze representations of trauma genocide trials (Schirmer et al. 2023).

The analytical capacities of generative AI are not the only way this technology can contribute to archive usability. Generative AI can be integrated into the digital archive functionalities to provide summaries of context in different formats (e.g., image, text, or video), translate individual content items into different languages, and enable archive users to enter information queries in the interactive conversation-like format. The latter feature is particularly important given the evidence that conversation-like exchanges with chatbots have the potential to render individuals more open and accepting of information that they would normally not agree with (e.g., Zarouali et al. 2021). Under these circumstances, the integration of conversation-like AI-powered interfaces in Holocaust archives has the potential to counter denialism and distortion more effectively.

Several practical and ethical challenges accompany the making of a digital archive of the Holocaust heritage in Ukraine. Practical challenges include contending with the vast sea of digital content and enabling possibilities for long-term preservation of the archive of captured content, categorization of archived materials, and design of user tools. The ethical challenges relate to copyright and privacy issues, as well as deciding how to manage content that propagates false narratives about the past or attacks victims and their descendants. The risks of bias of AI-driven tools, incompleteness of collected materials—including the possibility of some online data having been destroyed, and technical limitations for collecting certain types of content (e.g., journalistic materials protected by paywalls) present additional challenges.

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2 For an example of the application of the AI tools for automated enrichment of the databases containing semantically complex data, see https://glocon.ku.edu.tr/.

It bears acknowledging that digital Holocaust heritage in Ukraine is already being archived. Relevant content is being stored and processed by the general use AI/archiving initiatives, such as ChatGPT or Internet Wayback Machine, which captures a certain proportion of the Holocaust-related materials available online. However, to rely on these general initiatives in the long run is not sustainable, especially when certain aspects of Holocaust heritage are at serious risk of disappearance and destruction. General use initiatives are often characterized by the limited curating processes that are required to safeguard against potential collection bias and mishandling of sensitive, denialist, and manipulated or non-authentic Holocaust-related content. The consistency of snapshots of digital Holocaust memorial sites can also not always be ensured by general archiving initiatives, despite such consistency being integral both for the preservation of Holocaust heritage and for the study of its evolution over time.

These concerns are amplified by evidence of general use AI platforms (e.g., ChatGPT) being subjected to malfunctioning regarding information about contested and actively instrumentalized episodes of the Holocaust, in particular in the form of generating inaccurate or outright false claims (Makhortykh, Vziatysheva, and Sydorova 2023). To prevent this, it is crucial to explore the possibilities for developing Holocaust-sensitive AI solutions. These solutions should be designed in a way that will take into consideration the ethical and historical complexities associated with the event, along with the diverse range of threats to the preservation of Holocaust heritage. In the same way that curators are specially trained to deal with traditional forms of archives, a carefully trained and supervised AI platform is needed to implement the automatic process of selection, traceability, and navigability of the content. Such an approach must ensure that human-centered values, such as respect for the victims, are kept at the forefront of an archiving process.

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