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The digital turn in memory studies

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Abstract

This article examines the changes experienced by collective memory in the digital era. Contrary to the thesis that digital memory entails a new type of memory, which is radically different from the traditional conceptualization, I argue that the practice of digital memory materializes and implements the theoretical claims made by Memory Studies since the field's inception – collective memory conceived as a process, mediated and remediated by multiple media, with the participation of dynamic communities that perform rather than represent the past. In the article, I address what I propose are the following four major transformations that collective memory has undergone in the digital era: (1) the new ontology of the digital archive; (2) the shift from narrative as a privileged form of collective memory to the cultural form of the database; (3) the reconfiguration of agency, in which a distributed memory is performed by human and non-human agents in a dynamic entanglement; and (4) the shift from mnemonic objects to mnemonic assemblages, comprising persons, things, artefacts, spaces, discourses, behaviours and expressions in dynamic relatedness.

Keywords

algorithms, archive, collective memory, database, digital memory

Introduction

Digital media has had a significant impact on culture and everyday life by transforming the way we communicate, access information and entertain ourselves. From social media to online shopping and streaming services, digital technology has become an integral part of modern life and has reshaped the way we interact with each other and the world around us. The shaping and transmission of collective memory is no exception. It is therefore impossible to understand the mnemonic practices and objects of the present, and their future projection, without addressing the changes brought about by the digital turn. In this article, I will examine the extent and nature of these changes. I will look at recent discourse that raises the question as to whether these changes constitute a revolution, that is, a radical break with previous cultural frameworks, both in content and form, or simply an evolution in which continuity prevails. Are we witnessing a new ontology of memory? Is collective memory, as we know it, an endangered species?

In recent debates, there has been a marked tendency to interpret digital memory as a new type of memory – labelled as *mediated memory, connective memory* or *algorithmic memory*, which is

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radically different from the traditional conceptualization (Blom et al., 2017; Garde-Hansen et al., 2009; Makhortykh, 2021). Radicalizing this position, Andrew Hoskins claims that the digital turn implies the end of collective memory. Hoskins (2018) argues that the notion of collective memory is intrinsically linked to mass media: 'established (broadcast) media and collective memory are symbiotic' (p. 91). In the broadcast era, the collective, identified as the audience, was defined by the shared consumption of a representation: the classic 'media event', which provided both homogenization and stability to memory. Whereas in the digital era, the 'memory of the multitude' – the term Hoskins proposes to replace the collective – is not derived from spectatorship but rather made through participation. Transient, ephemeral, immediate and dispersed communities constituted through hyperconnectivity generate content that is constantly edited, re-edited, liked and altered, in a perpetual becoming. The memory that these virtual communities produce therefore lacks the homogeneity and stability that are the defining traits of collective memory. Instead, the memories of these virtual communities are intrinsically unstable, fleeting and incoherent.

Moreover, digital media have a feature that the traditional idea of the social does not necessarily possess: they are archival. The archival ontology of digital media results, according to Hoskins, in a fundamental loss of human agency and a radical unpredictability in the life cycles of memory. Hoskins describes this unpredictability using the image of 'shadow archives' that extend the potential life of our digital traces to an uncertain future. In sum, digital memory appears fundamentally unsteady, restless, boundless and governed by a technological logic whose temporalities and affordances are essentially different or even incompatible with the traditional functioning of collective memory – that is, to provide coherence, stability and identity to the group in the present and to project certainty into the future. This is why, in Hoskins' (2018) view, the term collective memory does not describe but rather obfuscates 'the radical transformations in memory that mark the twenty-first century' (p. 97).

I would rather claim the opposite: digital memory does not imply the end of collective memory. Instead, digital memory materializes and implements the theoretical claims made by Memory Studies since the field's inception: that collective memory may be conceived of as a process, mediated and remediated by multiple media with the participation of dynamic communities that perform rather than represent the past. There is no radical rupture or a new ontology of memory that requires reinventing, reframing or discarding the concept of collective memory. This does not imply that there are no changes, nor that we can continue to analyse memory practices with the same tools that we have applied before. On the contrary, it is imperative to account for these changes in order to understand the current conjuncture and set the agenda for the future. As Jan Baetens contends, referring to the discussion on the impact of the digital turn,

> it does not make much sense to launch general and somewhat abstract discussions on whether the digital changes culture [. . .] What is more interesting is the detailed analysis of impact as well as failure of impact of the digital in very specific cases, always in comparison with the larger cultural series of the medium under scrutiny. (Baetens et al., 2020: 99)

In the following, I will address what I propose are four major transformations that collective memory has undergone in the digital era: (1) the new ontology of the digital archive; (2) the shift from narrative as a privileged form of collective memory to the cultural form of the database; (3) the reconfiguration of agency, in which a distributed memory is performed by human and non-human agents in a dynamic entanglement; and (4) the shift from mnemonic objects to mnemonic assemblages, comprising persons, things, artefacts, spaces, discourses, behaviours and expressions in dynamic relatedness. In each case, I will show how these changes put into practice – and even enhance – the traits that define collective memory.

The new ontology of the digital archive

Although stability and permanence are frequently invoked as central features of collective memory, critics have pointed out that this may be the outcome of a distorted perspective. As Erll claims,

> Mnemonic constellations may look static and bounded when scholars select for their research, as they tend to do, manageable sections of reality (temporal, spatial, or social ones), but they become fuzzy as soon as the perspective is widened [. . .] Stability of memory may thus be an actor's (and scholar's) desire, but it is not necessarily the logic of memory [. . .] Memory fundamentally means movement (Erll, 2011b: 14–15)

In any case, stability is not equivalent to fixity or immobility, that is, to a representation of the past that remains the same, identical, untouched, over time. On the contrary, if social memory is always a representation of the past according to the needs and expectations of the present then the act of remembering is inherently dynamic, as we adapt, reinterpret and update our representations of the shared past following the dictates of the present. Ann Rigney (2008) emphasizes the dynamic working of collective memory, drawing on the metaphor of the swimmer, who 'has to keep moving even just to stay afloat' (p. 345). For Rigney (2016), 'the key to memory is not in storage (the fact of information being archived) but in the capacity of a particular story to stimulate its own reproduction in a new form: to procreate' (p. 68). Therefore, it is the capacity to generate new versions, to mutate and migrate in different media and formats, the ability to translate itself into new contexts, what characterizes collective memory. It is its dynamic character, the fact that it is a *practice*, a process and not a thing that defines collective memory's functioning and its paradoxical permanence (Bond et al., 2017; Erll, 2011b; Olick and Robbins, 1998; Rigney, 2016). If we consider mobility as the key feature of collective memory, it is possible to postulate that the ontology of the archive in the digital era constitutes the most perfect actualization of that dynamic character. Digital archives do not threaten the stability or permanence of our representations of the past but on the contrary, they put into practice the mutation and circulation that keeps memory alive.

In theorizations of collective memory, the archive has been the most powerful and enduring metaphor. Well-known analogies of memory such as Plato's wax seal or table, the loci of classical art or Freud's mystic writing-pad, rely on the 'imprints-on-a-substrate paradigm'. According to this paradigm, memories 'are stored as traces in specific places, even if they are not always readily available' (Burton, 2008: 322). The archive is not a synonym for memory and it should not be conflated with the act of remembrance, which, as we stated earlier, is an essentially performative act. The archive refers to the substratum, the condition of possibility, of the act of remembrance. The difference between the substratum and the act is exemplified by the distinction between 'canon' and 'archive' proposed by Aleida Assmann (2008), in which the canon represents the active circulation of memory that keeps the past present while the archive refers to the passively stored memory that preserves the past as past.

The traditional archive is identified with a series of institutions – libraries, museums, universities, national archives – devoted to selecting, classifying, storing and preserving the objects and documents of the past. As Røssaak (2010) highlights, 'The archive used to be the place where time became space, where bits and pieces were exempted from the flow of time and safely stored away'. In this sense, 'the desire to halt is the primordial archival desire' (p. 16). What happens in the digital age is that the static archive is replaced by an 'archive in motion' (Røssaak, 2010). Archives are no longer files or spaces outside the flow of time but now rely on the intrinsic dynamism of techno-mathematical operations that govern the storage and transmission of data. In Ernst's (2013) view, in

'the age of technology-driven media, both material archaeological strata and the symbolical order of the archive are progressively being conceived as essentially *processual* by nature' (p. 27).

Despite the seemingly intrinsic association between digital media and storage, the digital differs radically from traditional archival storage because what is stored is not an object but a code: a code is merely the *potential* to generate a representation, not the representation itself. Blom (2017) asserts that 'To the extent that computer memory exists, it is essentially activity; virtual as well as actual, and its images are electronic events' (p. 12). The digital network archive is based on the permanent circulation of data, which are updated and translated between the different systems before they are perceived as readable in our interfaces. Digital archives are not places in which objects or documents are stored; rather they are *procedures*, technomathematical operations which store data in a *conditional* form and, therefore, are always potentially other.

The temporality of digital media is what Wendy Chun (2008) has termed the 'enduring ephemeral', which refers to the tension between the seemingly permanent nature of digital information and the fact that it is constantly changing and disappearing. On one hand, digital data appear to be permanent and stable, as it can be easily replicated and stored in multiple locations. This has led to the belief that digital information is everlasting and always accessible. However, on the other hand, digital data are constantly being updated, modified and deleted, making it ephemeral and difficult to preserve. Chun's (2008) concept of the 'enduring ephemeral' stresses that (digital) data are not a static entity, but rather a constantly evolving and shifting one, often with a logic that we cannot control.

But digital archives are not only dynamic because of the technomathematical operations that permanently rewrite the content, but also in a second aspect: the collaborative creation and maintenance of archives. A fundamental shift can be observed in the archiving practices: if they were once the responsibility of experts and mnemonic institutions, they are now also the responsibility of amateur communities that collaboratively produce and maintain archives, continuously updating their content. De Kosnik's (2016) book, titled *Rogue Archives: Digital Cultural Memory and Media Fandom*, which analyses 'rougue archives' – fan fiction archives created and managed by minority groups – is a paradigmatic example of the work of technovolunteers archivists that preserve and share cultural artefacts that are often disregarded, banned or considered outside the mainstream cultural canon.

Both conditions of the dynamic character of the digital archive have led to concern, or even panic, about the loss of the material that testifies to the past. Many critics contend that due to the vulnerable and fragile character of digital media, we may be living in a 'dark age', 'a time of which future generations will have scant records, owing to the short lifespans of our current digital platforms, devices, and applications (as compared to the lifespans of older technologies, such as paper)' (De Kosnik, 2016: 46).

How to confront the inherent dynamism of the digital archive? I will briefly present two very different responses, which also refer to different digital entities. The first pertains to the dynamism of the web, and the second to digital-born objects, although both can be encompassed under the overarching metaphor of the archive.

In *The Archived Web: Doing History in the Digital Age*, Niels Brügger (2018) addresses web history – understood in a dual sense, both as creating a history about the web and as making history based on the web as the primary source.

For Brügger, it is evident that the online web is not an archive in itself, although it may seem so at first glance. As an archive, the web is volatile, subject to deletions or changes that can occur on an unprecedented scale and pace compared to other media. The question is how to document these changes – how to archive the web – in order to use it as a future source for writing the history of our culture, especially considering that, in many cases, the web is not a supplementary source but

the only available source. Someone – an individual, a group or an institution – has to collect, preserve and make this archive available.

Brügger's book proposes a theoretical and methodological approach to the web as a source for historical research – although his reflection is clearly relevant to other disciplines, especially memory studies. He examines which institutions are currently involved in the archivalization of the web, what strategies they implement, and how researchers should deal with the strategies that shape that archive. Moreover, Brügger proposes a methodological approach to the web as an object of study, where certain conceptual distinctions become essential. Brügger (2018) argues that 'just because digital media are digital, they are not necessarily digital in the same way; each has a specific digitality' (p. 5). With this insight as a starting point, he suggests that digital media may be grouped under three major headings, depending on their provenance that is, on how they became digital: digitized media (nondigital media that have been digitized), born-digital media (media that have not existed in any form other than digital) and reborn digital media (born-digital media that have been collected and preserved, and that have been changed during this process; Brügger, 2018: 5).

The archived web corresponds to the third type, and this adds another layer of meaning to the dynamic ontology of the archive in the digital era – although paradoxically, it is the result of a preservation operation. To complement the theoretical framework, Brügger (2018) proposes an analytical grid that distinguishes five web strata:

> the web element, the web page, the website, the web sphere, and the web as a whole. Each of these strata may be approached by focusing either on the visible side – for instance, the web element of a photograph as seen on a web page – or on the hidden text of the HTML code that produces both the photograph and the image file. (p. 31)

This grid is not only useful for grasping the web as an object of study but it is also helpful in specifying the different senses encompassed by the term 'digital archive', which are often juxtaposed or used interchangeably. For example, Lister's (2013) theorization of digital photographs as 'transient photographs' – 'it is in the nature of digital networked images to exist in a number of states that are potential rather than actual in a fixed and physical kind of way' (p. 8) – refers to an element whereas the study of an online memorial like the *Digital Monument to the Jewish Community in the Netherlands* corresponds to a website. In this sense, the phrase 'archive in motion' acquires particular characteristics and dynamics in each case.

While Brügger emphasizes the need to document and preserve the changes that the web undergoes in order to ensure its use as a source for historical research, other proposals lean towards an opposite solution. Instead of preserving what resists preservation, they advocate implementing strategies that remain faithful to its transformation.

I refer to another area of debate – not historical research but the field of digital literature. In this case, it is not about the web but born-digital objects. Unlike a book, a digital literary work is not only a transmittable object but also, fundamentally, a process that can only exist through actualization – this is also valid for digital-born mnemonic objects. When the technology that supports the work becomes obsolete, the digital work disappears. What are the options, then, to preserve the work? Depending on the nature of the digital creation and the author's aesthetics, there are the following three potential strategies for dealing with the perennity of a digital creation. These are the following: (1) archiving the work in conjunction with all relevant documentation that showcases its development, (2) recreating and reinventing it on a continual basis or (3) embracing its ephemerality and letting it go (Bouchardon, 2019). Although all three options are legitimate, Bouchardon favours the option of continually recreating and reinventing the works. This option implies another

model of archiving but also of memory, from a model of stored memory to a model of reinvented memory. In this model, since the archive is in constant evolution, the task is not about guarding the content in its original state but about 'bearing witness to the continuous transformation of an identity that requires constant evolution' (Bouchardon and Bachimont, 2013: 191). According to the authors, 'from an anthropological point of view, this model of memory seems more valuable and more authentic that the model of printed media which is a memory of storage' (Bouchardon and Bachimont, 2013: 191). I would add that the concept of 'reinvented memory', stemming from the dynamic nature of the digital archive, reconciles the terms 'memory' and 'archive'. The digital archive is no longer a passive storage space for traces of the past; instead, it becomes a medium and witness to the ongoing changes and transformations that memory continually undergoes.

The shift from narrative to database

Narrative is a central concept in cultural memory studies (Erll, 2011a; Freeman, 2010; Neiger, 2020; Rigney, 2016). It is assumed that memory has a narrative form in which the representations of the past adopt the form of stories. These stories not only explain what happens – framing the beginning and end of the events, ordering them in a linearity of causes and effects – but are invested with lessons that guide mnemonic communities to face the present.

The claim that memory is inherently or exclusively narrative is evident in mnemonic media that are central to the construction of cultural memory, such as literature, film and even journalism. Projecting the narrative form onto other media, however, is questionable. For example, in the case of photography, is it by definition anti-narrative, or does it only become meaningful when we can read beyond its duration, recounting the history of which the image functions as a key? (for the relationship between photography and narrative, see Shevchenko, 2016: 281–282). The same question arises if we focus on the 'repertoire' (Taylor, 2003). Are embodied forms of memory – like performances, gestures, orality, dance, rituals, music – inherently narrative? Or do they rely on other forms of meaning-making in which different logics play a central role? Maybe the centrality of narrative as the essential cultural form of collective memory is a consequence of having privileged the archive over the repertoire, and thus overlooking the many other ways that we collectively shape, transmit and live our pasts.

In his seminal book *The Language of New Media*, Lev Manovich (2001) claims that in the digital era, narrative as a cultural form has been replaced by the database:

> After the novel, and subsequently cinema, privileged narrative as the key form of cultural expression of the modern age, the computer age introduces its correlate – the database. Many new media objects do not tell stories; they do not have a beginning or end; in fact, they do not have any development, thematically, formally, or otherwise that would organize their elements into a sequence. Instead, they are collections of individual items, with every item possessing the same significance as any other. (Manovich, 2001: 218)

While the narrative creates a 'cause-and-effect trajectory of seemingly unordered items (events)', the database 'represents the world as a list of items' (Manovich, 2001: 225). In fact, the database is not an arbitrary collection of items but a structured collection of data.

Although not all digital objects follow this logic (Manovich gives the example of computer games that have a narrative structure), from the perspective of the user, the vast majority of digital objects are databases: collections of items on which the user can perform various operations such as view, navigate, search or retrieve. The majority of digital mnemonic objects assume this form. For example, digital projects like The September 11 Digital Archive (2023) or the *Oral Archive of Memoria Abierta* – a collection of victims' testimonies of State terrorism in Argentina (Memoria

Abierta, 2023) are databases made up of text blocks, images, digital video clips and links to other pages. Institutionally, the digitization of cultural heritage that museums, libraries and national archives have undertaken since the dawn of the digital age presents itself as sometimes immeasurable databases. Europeana (2023) is an excellent example of the conversion of Europe's cultural memory into a database that provides citizens with access to the objects, events, images, texts that make up the continent's heritage. The open character of the web as a medium also implies that new elements can always be added to these databases, which also contributes to the anti-narrative character of digital objects because narrative is, by definition, finite. Even those mnemonic digital objects that do not resemble databases – for example, a virtual tour of a museum collection or the virtual tour of Argentine clandestine centres created by Huella Digital (2023) – are based on the same logic. Although these digital objects suggest to the user a series of performative activities such as moving from one space to another, contemplating certain objects or manipulating them, they remain databases insofar as their texts, audio or video clips constitute structured collections of data that, in this case, are accessed 'through the interface of a body' (Manovich, 2001). In summary, the logic governing the organization and access to digital data is the database. Whether we access a previously structured database – for instance, a collection of testimonies – or construct a database from user interactions on Twitter around a specific event – in both cases, the operations are similar. Information is organized through the abstraction of certain units defined beforehand, units that may not necessarily be visible when considering the texts individually. The relationship between these units grants us access to the system of meaning.

However, it is important to emphasize that the narrative and the database should not be considered as opposing terms but rather as existing in a symbiotic relationship. While Manovich refers to narrative and the database as 'natural enemies' to highlight their differences, in reality, these two cultural forms maintain a mutually constitutive relationship, or as Katherine Hayles puts it, they are 'natural symbionts'. According to Hayles (2007), the nature of databases 'demands narrative's reappearance as soon as meaning and interpretation is required' (p. 1603). The symbiosis between the two enables the emergence of new forms of telling that incorporate narrative elements, just as contemporary narratives often incorporate aspects of databases.

One of the most prominent examples showcasing the potential of the database as a cultural form is the USC Shoah Foundation Visual History Archive (2023). This visual archive houses over 53,000 video testimonies, totaling around 100,000 hours of testimony. Each testimony has been segmented into 1-minute segments and indexed with keywords to create a monolingual controlled vocabulary known as the Thesaurus. This enables users to search and retrieve testimonies using a structured query language (SQL) query based on specific parameters. Rather than simply listening to the narratives, users can explore these narratives in a distinct manner by searching for specific topics or themes, observing structural patterns, symmetries and deviations, and discovering new relationships among the characters, events and settings portrayed in the testimonies that might not have been otherwise considered together.

What does the database allow us to do that is not possible through traditional listening to testimony? And what is the specific relationship between narrative and database? The database allows us to engage with testimonies in ways that traditional listening alone cannot achieve. Specifically, the database enables comprehensive listening to all testimonies, which would be otherwise impossible. Todd Presner (2016: 193) emphasizes that a database and computational representation exist primarily to manage scale, allowing us to 'listen' to all testimonies. Similarly, the project 'Listening to All the Stories: Developing a Sequential Narrative Analysis Algorithm for Holocaust Testimonies' that utilizes USC Shoah Foundation's Visual History Archive, highlights the database's capacity for comprehensive listening. By managing scale, the archive is democratized, giving equal attention to all histories rather than a limited set of canonical ones. The 'ethics of the algorithm', as

Presner (2016) puts it, lies precisely here, in the fact that computational or algorithmic analysis 'takes into account the fullness of the archive insofar as all the indexed data related to the narrative of every survivor is part of the analysis' (p. 199). This approach ensures a more inclusive and comprehensive analysis of the testimonies.

The core of the relationship between narrative and the database lies in the ability to uncover connections that may go unnoticed when listening to testimonies individually. Through the database, users can create their own narrative projects by remixing and hybridizing narrative segments from search results. Todd Presner refers to this approach as 'distant listening', drawing on Franco Moretti's concept of 'distant reading'. Presner (2016) explains that

> the perspective of distance allows us to see different things than the perspective of closeness (characterized by close, attentive, detailed reading). By confronting scale, 'distant reading' – or, in our case, 'distant listening' – reveals structures, patterns, and trends that are not discernable when the focus remains on just a handful of close readings of individual texts. (p. 198)

When narratives are deconstructed into smaller segments that can be rearranged, new narratives can emerge from these combinations, revealing hidden structures and deviations. This process challenges the fixation of familiar narratives, where stories become so well-known that they lose their potential to engage the listener. For Presner, 'distant reading' opens up new ways of listening that can disrupt fixed and familiar representations of witnessing, leading to the exploration of divergent testimonies.

In 'History in the Era of Massive Data', Clavert (2021) provides another example of a distant reading of a database. Clavert analyses the commemoration of the centenary of the First World War on Twitter covering the period from 2014 to 2018. Applying various computational methods, including co-occurrence and topic modelling, the study allows us to observe different aspects of the commemoration: first, a hierarchy of the commemorated events. For example, the 100-year anniversary of the Armistice on 11 November 2018, received the most tweets. The second with the highest number of tweets was the Battle of the Somme. The list also reveals which events are conspicuously absent, for instance, the centenary of the assassination of Franz Ferdinand. Second, an analysis of the content of the tweets demonstrates central themes – in the case of France, it shows a notable continuity with the collective canonical memory of the First World War. However, most importantly, the study of mnemonic practices on Twitter introduces a new element: the circulation of information and its inherent temporality. The speed at which information circulates on Twitter, often tied to controversies or conflicting elements, produces 'short but very interesting moments of information circulation'. 'These kinds of controversies are typical of the way information is disseminated, the way the "vibrations" described by Boullier have arisen with online social networks' (Clavert 2021: 187).

These peaks are related to a temporality specific to social media, which has been subject to various theorizations – for example, as an expansion of the present or as 'updatism' (Pereira and Lopes De Araujo, 2017). According to Clavert (2021), 'it is not yet clear how these vibrations influence collective memory and its temporality' (p. 187). What is clear is that the distant reading of the database, in the case of social media, raises questions about the narrative character of collective memory in a fundamental aspect: duration. What is the duration of the present? Is it an expanded present where past, present and future are juxtaposed? Or is it a present reduced to its minimum expression and deprived of meaningful connections with the past and the future? What does 'intensity' reveal? Is it an ephemeral moment without consequences, or an affective connection with the past whose traces are lasting?

In summary, the shift from narrative to the database as a cultural form does not imply the replacement or elimination of narrative as a central aspect of collective memory. Instead, it raises

central questions about narrativity, revolving around duration, non-linearity and the very definition of the present and the past. Moreover, it revitalizes narrative by generating new stories through unforeseen or previously invisible relationships facilitated by computational tools. These tools bring new perspectives and interpretations of the past to life.

The role of algorithms and AI

Another essential feature of memory is that it is always mediated (Garde-Hansen, 2011; Neiger, 2020; Neiger et al., 2011; Van Dijck, 2007; Van House and Churchill, 2008). Memory, both individual and collective, is externalized in different media that do not act as mere passive containers, but actively shape our experience of the past. As Marita Sturken (2008: 175) contends, 'cultural and individual memory are constantly produced through, and mediated by, the technologies of memory', and that is why, 'the question of mediation is central to the way in which memory is conceived'.

Though many in the field of Memory Studies assert that media and collective memory are entangled, there nevertheless remains a persistent idea that there is a previous, original content that is subsequently externalized in a given medium. Nevertheless, this image of technology has been challenged by critics who support a different view on the relationship between memory and technology. Bernard Stiegler (2010) developed a theory of memory called *technogenetics*, which emphasizes the entanglement of human and technology. From this point of view, there is no separate subject preceding or existing outside of technology. Technology and the subject are consistently involved in a process of becoming (Prey and Smit, 2019: 210). Stiegler proposed that human memory can be divided into three types of retention: primary, secondary and tertiary. Primary retention is the raw, unprocessed data that we receive through our senses. Secondary retention refers to the memory of that experience. Tertiary retention is the external storage and retrieval systems we use to store and retrieve our memories, such as books, computers and other technologies. However, for Stiegler, tertiary retention is prior to primary and secondary retention. Tertiary retention provides the framework and context within which primary and secondary retentions can be understood and interpreted. In other words, the cultural and technological forms of memory that exist in the world around us provide the templates for our individual memories and experiences. Tertiary retention is thus constitutive of primary and secondary retention. For Stiegler (2010), 'Human memory is originally exteriorised, which means it is technical from the start' (p. 67).

In the new digital ecology, Stiegler recognizes a shift from *mnemotechniques*, the artificial storage of individual memories that characterizes hypomnesis from ideogrammatic writing to the print revolution, to *mnemotechnologies*, the embedding of memories within technological systems that systematically order memories according to their own logics. Mnemotechnologies constitute a new articulation between memory and technology, the main difference being that, while previous technologies of memory such as the book or photography stored memory, the digital now not only stores but *organizes* memory according to their own logics.

Today, we increasingly rely on digital devices and platforms to access collective memory. We look for information on Google about historical events, tour digital museums, mourn online and let Facebook or Instagram curate our personal networked memories – determining what we remember, what we forget and how we do it. This implies a reconfiguration of agency, in which a distributed memory is performed by human and non-human agents in a dynamic entanglement.

Algorithms and artificial intelligence (AI) are the base of computers' agency. An algorithm is a set of instructions or rules that a computer programme follows to solve a specific problem or complete a task. AI, however, refers to the ability of machines to perform tasks that typically require human intelligence, such as recognizing speech, interpreting natural language, understanding

complex data patterns and making decisions based on data. AI systems may use algorithms as a tool to achieve their objectives, but they also incorporate other components such as machine learning, natural language processing and deep neural networks. Basically, the tasks AIs perform can be divided into three categories: sensing, reasoning and acting. AI systems collect data, they draw conclusions about the data and they elaborate a response to the user (Hammond, 2015). As we rely more and more on information retrieval from the Internet, these systems become 'gatekeepers of memory that shapes how the past is understood and perceived' (Makhortykh, 2021: 182).

Algorithm-driven information retrieval systems are particularly complicated and opaque. This is one of the main concerns about the role of the digital in our access to collective memory. When we look at a query on Google about the Holocaust, for instance, different factors can determine the response that we get. Makhortykh (2021) points to this, claiming that in regards to the Holocaust search engines often prioritize images related to Auschwitz while downplaying content about other concentration camps. Although this can be explained by the importance that Auschwitz plays as a symbol of the Holocaust, this also may be given because Auschwitz is often searched as a popular destination for so-called dark tourism. For Makhortykh (2021), 'this lack of clarity is troubling, considering that algorithm-driven decisions define how visible and, consequently, recognizable specific aspects of the past will be' (p. 182). Although the lack of clarity of algorithms is the point in question, I would also like to consider what could be regarded as the social, or collective, character of algorithms. Self-learning algorithms not only reflect the perspective of the user – that is, the interests, position and perspectives of the user based on the history of his or her previous searches – but also, and this becomes crucial for the collective character of memory, the perspective of other observers. What the user observes through the machine is the outcome of processing other users' observations. Algorithms answer our query of, for example, the term 'Holocaust', by seeing what previous users searched for and which information they found most relevant. The algorithms do not read the pages themselves or analyse their contents, instead their reading and analysis is of the behaviour of previous users, which could be interpreted as the collective perspective on that topic or that question.

As John Gianandrea, director of engineering at Google, declared, 'when one is googling the word "Einstein", we're not trying to tell you what's important about Einstein – we're trying to tell you about what humanity is looking for when they search'. The intelligence of the system is the intelligence of the users that the algorithm exploits to direct and organize its own behaviour (Esposito, 2022: 12–13). This is what Esposito (2022) calls 'virtual contingency' (p. 10), the ability of algorithms to use the contingency of users to as a means of acting as competent communication partners. In her last work, Esposito proposes replacing the term *artificial intelligence* with the term *artificial communication*. Computers are not intelligent, they do not think, they execute calculations. Their efficiency depends precisely on the fact that they do not imitate human intelligence but do something different. Based on Niklas Luhmann's concept of communication – in which communication is not defined only in relation to conscious subjects, shifting the focus from the sender to the receiver – Esposito proposes we think of our interaction with digital systems as partners that participate in an 'artificial' communication. The question is how reliable these partners are?

I would like to argue that virtual contingency provides, in that sense, privileged access to collective memory, since what we get is the collective perspective about the memory topic. What are the images, texts and institutions that are the primary contents of a particular event or figure of the past for (virtual memory) communities? Coming back to the example above, if the prominence of Auschwitz in search results reflects not only its emblematic character but also the site of memory as a destination for dark tourism, is this not also a component of the collective memory of the Holocaust (even if it includes problematic aspects that express a complex relationship with our representations of the past)?

The output, as we know, is based on the archives currently available on the web. This is not a curated archive, but one that contains errors, prejudices and biases. It provides access to the state of collective memory about a certain event, epoch or figure without regulation or supervision. In this sense, it represents collective memory in the more 'real' sense, insofar as it includes not only the normative but also the irregular, the banal, the marginal. Naturally, access to an uncurated archive posits a problem that consists in the dissemination of those same prejudices and biases that the original material contains, a problem that is further compounded by the use of generative AI, such as ChatGPT. As is clear in the case of ChatGPT, AI not only makes the collective memory visible but also generates it.

As Kansteiner (2022) discusses in relation to the utility of AI for historical studies, tools like GPT 'cannot differentiate between truthful and untruthful statements, and rapidly disseminate the structural prejudices contained in the material that was used to train them' (p. 125). For instance, an imagined corpus of 20th- and 21st-centuries film and television footage would contain 'plenty of technically pristine, unmanipulated historical propaganda material' (Kansteiner, 2022: 124) and also could generate manipulated images presented as true or deepfakes. Although Kansteiner is optimistic about the utility of AI for historical research, he concludes that in order to avoid the dangers that AI entails, human agency is necessary at the input and output level.

Returning to Stiegler, the relationship with technology is ultimately an irreducibly political question. Dependence on artificial aids can function in different ways depending on the articulation between hypomnemata and anamnesis. If dissociated, memory technologies can be instruments of manipulation at the hands of societies of control; but, however, these same technologies can expand our capacity to produce meaning and to form communities open to the future. As Hansen (2010) contends, 'everything hinges on how hypomnemata are articulated with anamnesis, and on the political struggles that must and can only be waged through the technologies that at once empower us and threaten our individual and collective agency' (p. 66).

From mnemonic *objects* to mnemonic *assemblages*

The last point that I would like to address is *redundancy* as an essential trait of collective memory. In 'Rethinking the concept of collective memory', Schwartz (2016) draws on the transmission of myth to explain redundancy. An individual, A, is trying to get a message to a friend, B, who is almost out of earshot, with communication further hampered by various kinds of interference – noise from wind, passing cars, and so on. What will A do? A will repeat the message several times, rephrasing the message and supplementing his words with visual signals. Even if B was not able to fully understand the meaning of each individual message, he will get the redundancies, which will finally convey what is really being said. As Schwartz (2016) claims, the 'meaning of the message is not in any single one of its versions or carriers but in all versions and all carriers taken together [. . .] the more varied the narrative, the more accurately it is conveyed and remembered' (p. 13).

Cultural memory is not located in any single carrier but is distributed among and across a multiplicity of mnemonic objects. This distribution should not be conceived as static – something that Schwartz's phrase 'all versions and carriers taken together' seems to suggest – but a dynamic process through which the representation of the past is not only transmitted but essentially kept alive.

The concept of *remediation* has consistently been invoked as one of the nodal points to describe the dynamics of cultural memory (Erll and Rigney, 2009). Introduced by Bolter and Grusin (1999) in their influential work *Remediation: Understanding New Media*, the concept has been adapted to the study of memory to refer to 'the continuous translation of media content from older to newer media and from one platform to another' or, to put it differently, 'the recurrence of a story across "plurimedial networks"' (Rigney, 2016: 69–70). Although the concept of remediation highlights a

dynamic performance in the sense that it points to how memory travels or migrates from one media to a different one, formulated as such, it also suggests that we can trace the 'story' by analysing discrete mnemonic media or discrete mnemonic objects. This is what the digital environment calls into question.

This is not because the digital medium is considered a 'post-medium' that summarizes and surpasses all previous media (for a critique of why digital is not a post-medium, see Baetens et al., 2020). Rather, it is because the dynamics of intermediality and transmediality that dominate the digital environment are much more complex and makes the analysis of discrete media, and the consequent idea of migration from one singular medium to another, difficult to maintain. However, the redundancy that defines collective memory, that is, the fact that the meaning we attach to the past does not reside in a particular object or mnemonic site but in a dynamic and contingent multiplicity, can be captured in the digital age with the concept of assemblage, particularly mnemonic assemblage.

Assemblage theory represents a different view of the social world, usually conceived as a series of discrete social objects or phenomena (DeLanda, 2006). Instead, DeLanda proposes we think of the social world as compositions of heterogeneous elements that enter into relation with one another. These elements are physical objects as well as events, bodies, signs and expressions. Assemblage theory emphasizes the importance of understanding the connections and relationships between these different elements, rather than treating them as separate and distinct.

If digital memory is relational, situated and transindividual, we need to account for the human and non-human actors that make up the dynamics, practices and procedures that these actors carry out, as well as the space and time in which these dynamics take place and the discourses and expressions that sustain them. The relationships that foster each of these heterogeneous components make up a configuration which acquires an always-provisional stabilization.

An example of mnemonic assemblage is provided by Papailias (2016) regarding mourning:

> Mourning, as an assemblage, links the bodies of mourners with matter (corpse, coffin, mourning clothes, jewelry, gravestone, cemetery dirt, ashes, etc.), technologies (epitaphs, embalming, cremation, photography, digitization, etc.), ideologies of mourning (the 'proper' burial, traditions of ritual lament), and institutions (church, state). Habits of mourning can reign in the tremendous intensities unleashed by death (especially when untimely), reconfirming the social and political order and its hierarchies. Yet, the mourning assemblage also can disassemble scripted concretizations with unexpected consequences (i.e. AIDS activism). (p. 447)

In a more extensive work, *Feminist Afterlifes: Assemblage Memory in Activist Times*, Red Chidgey (2018) uses assemblage as an approach and a tool to explore feminist activism and memory.

The question is then how to account for multiplicity or recurrence without relying on the dynamics of remediation. In digital ecology, analysing how content migrates from one medium to another does not make sense. Instead, it is necessary to identify the plurimedial within the same configuration. Redundancy is achieved through the entanglement of heterogeneous elements, including both human and non-human actors. The concept of mnemonic assemblage permits us to grasp a provisional, contingent plurimedial configuration where the elements are interconnected in a process of becoming.

Whither memory studies?

The impact of the digital revolution has brought about significant changes in collective memory. Archives have transformed into dynamic entities, challenging traditional storage practices and

promoting new archiving practices that democratize access to information. However, this democratization also creates a tension between institutional curation and the more unconventional nature of 'rogue' archives. The rise of databases as cultural forms has enabled the creation of new narratives by utilizing computational tools, uncovering patterns, structures and deviations that were previously unseen. The mnemonic objects, which were once studied individually, have now become multi-dimensional entities that require a deeper understanding of their internal complexity. Furthermore, technology plays an active role in shaping and transmitting collective memory through algorithms and artificial intelligence, raising questions about the extent, methods and reliability of artificial communication partners.

The impact of these changes means that we can no longer investigate memory in the same manner as before. While traditional objects and practices associated with memory have not disappeared, they have been transformed. We still construct and visit memorials and museums or engage with literature and films to gain insights into the past. However, this continuity does not imply that everything remains unchanged. Even when we physically visit a memorial, the experience is now preceded or augmented by virtual reality or augmented reality tours, which reshape the way we engage with the physical space. Memory is no longer confined to the traditional spaces and places we typically associate with it. Instead, it now unfolds not only on screens but within a complex network of interconnected systems, materials and environments infused with digital elements.

In summary, why should scholars focus on digital memory and what are the implications? As I hope to have demonstrated, I view digital memory as an approach that recognizes the inherent mobility, plurality and technological nature of memory. Embracing this approach entails shifting away from research focused solely on specific sites or objects and instead showing an interest in the dynamic and ever-changing processes of memory which are inherently provisional and open to future developments.

Memory studies should reconsider the role of technology, which raises fresh inquiries about the mediated nature of collective memory. However, these debates must adopt a genuinely global outlook. The tension between institutional curated memory and the potential trivialization of memory in the digital realm is noteworthy in Holocaust memory, but it becomes less relevant in other contexts, such as certain Latin American countries, where the memory of past atrocities lacks state institutionalization and grassroots initiatives in the digital sphere drive memorialization projects. Without a perspective that considers diverse mnemonic traditions, the debate risks being biased and incomplete.

Finally, it is imperative to develop new methodologies that encompass both the utilization of computational tools, like 'distant reading', and the creation of innovative non-technologically reliant approaches. These methodologies should enable us to comprehend and analyse contemporary phenomena effectively.

The digital revolution in memory studies provides an opportunity to reexamine and challenge fundamental assumptions in the field, including the traditional notion of memory being intricately tied to stable or permanent identities. It prompts us to explore how overlapping and transient identities emerge through – and rely on – mnemonic processes despite their impermanence. Furthermore, the mnemonic efforts undertaken by online communities, such as those described by De Kosnik as 'rogue archives', compel us to reassess the criteria we use to determine which memories, methods and actors are deemed legitimate and deserving of recognition. This necessitates moving beyond a narrow focus on memories associated with human rights violations and mass atrocities and acknowledging other mnemonic forms and processes that may seem mundane, marginal or less significant in comparison to memory shaped by the imperative of 'never again'.

In summary, the digital turn goes beyond the study of digital objects alone and instead investigates how the digital realm has transformed contemporary mnemonic culture, resulting in the

reconfiguration of actors, objects and practices. Shifting our focus towards digital memory not only enables us to comprehend the modern landscape, but also presents an invaluable opportunity to reexamine the research practices that have dominated the field of memory studies and to evaluate whether these practices have been faithful to the features with which we have defined our object of study.

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