The Past Next Door:
Neighbourly relations with digital memory-artefacts

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Abstract
How does digitization reshape people's engagement with their past? As ever more moments and interactions are objectified as digital data (photos, e-mail, IM protocols) stored in digital archives that are constantly available and used intensively as memory aids, people's engagement with their past is increasingly mediated by databases and algorithms. The article explores how the non-narrative, paradigmatic structure of the database then remoulds memory. More specifically, it is suggested that once encounters of people with representations of the past from their personal archives are mediated by search and sorting algorithms, memories lose their status as docile objects. When memory objects can appear in unexpected places and times, their agency qua memory actants can no longer be blackboxed. Rather than relations of possession, people then have neighbourly relations with the memory objects that populate their digital environments.

In May 2010, *Facebook* introduced a new feature: the *Photo Memories* widget. This new box showed *Facebook* users old photos of their current and past friends, chosen by an algorithm. Within days, the new feature faced wide criticism from users and the media. Above all, users complained about being unwillingly exposed to photos of their ex-partners (alone, with themselves, or with their new partners), now presented to them in the most conspicuous location and must be encountered on a daily basis. Other users complained about having to watch photos of dead friends. The new feature brought up painful memories, making them almost impossible to ignore. Less than half a year after its inauguration, *Facebook* responded to public pressure by introducing revisions to the algorithm, which now avoided showing photos of those recognized by the system as ex-partners. A few months later, they removed the feature altogether.

The *Photo Memories* widget, I suggest, is exemplary of a new ecology of memory, that is, of the system of cultural, mental, and technological structures that shape our relationship with traces and representations of the past.[1] By 'ecology of memory' I mean the number, form and content of these representations; the status ascribed to them; the circumstances in which people encounter them and attend to them and the frequency of these encounters; and how these encounters impact people's life, knowledge, and conceptions of the past. Our digital ecology of memory is emphatically different to its predecessors. This essay aims at contributing to our understanding of how digitization has transformed the ways in which individuals engage with their personal past. In particular, it is suggested that the paradigmatic structure of the database redistributes the agency of memory, and that 'neighbourly relations' may be a helpful metaphor to describe this new ecology.

While this essay is theoretical in nature, I illustrate the arguments with a few examples taken from interviews conducted with Israeli young adults for a study on digital photography (Schwarz, 2010), and from blog excerpts in which bloggers discuss recollection events. Blogs are uninitiated egodocuments that offer researchers precious information on everyday practices (Schwarz, 2009). However, my purpose here is not to offer any systematic contextualized study of memory practices, but rather to theoretically explore some major implications of digitization on contemporary memory.

Digital materialities and the future of the past

Influenced by Actor-Network Theory, theorists of memory such as Jose van Dijck, David Middleton and Steven Brown no longer think of memory as a stable *object* that lies within the individual (an archive, file drawer or wax tablet), but rather as an *achievement*, produced by the interactions between humans and non-humans and the practices that regulate these interactions (Bowker, 2005; Brown & Hoskins, 2010; Hoskins, 2009b; Middleton and Brown, 2005; Guggenheim, 2009; Sturken, 2008; van Dijck, 2007, 2011; Wertsch, 2002). Biological neural networks, technologies and material objects (be they pencils or computers, madeleine cookies or historic buildings), and cultural practices (such as mnemonic techniques or diary keeping) all share this achievement, all contribute to the engagement of individuals, networks and collectives with their pasts. Material objects are indispensable for many ways of representing and re-presenting the past, as people bring the past to the present by engaging with its material representations. Memory-in-the-head and memory-in-the-world should thus be studied in conjunction (Hoskins, 2011b). This increased sensitivity to materiality paved the way to closer explorations of the digital *mediation* (van Dijck, 2007) and *mediatisation (*Hoskins, 2009b*)* of memory. Media ecologies and memory ecologies are thus viewed as interdependent, due to the co-evolution of memory practices and media technologies (Hoskins 2011a).

Three major theses may be identified in the literature concerning the uniqueness of digital memories: the connectivity thesis, the world without forgetting thesis; and the flexible memory thesis.

The connectivity thesis suggests that memory is reshaped in the form of computer networks. The new memory aggregated by individuals in social network sites is shaped by the digital network structure and by their state of constant connectivity. This memory transcends the traditional dichotomy between private/personal memory and the public/collective memory shaped by mass media representations, as memory objects are disseminated across networks (enabling personal impressions to be transformed into public memory: Reading, 2009), yet subjected to individual curatorship and the unique structure of egocentric networks. Similarly, this connective memory transcends the dichotomy between active/canonical lived memory and passive/archival memory (as the archive is permanently accessible and casually used in everyday life: Hoskins, 2011b). This new 'connective' or 'social network' memory is claimed to usher in a new temporality of 'continuous present' or 'immediate present-past'. These representations of the past and their unique temporality are produced by heterogeneous networks consisting of people, computers, and algorithms that aggregate and sort the contributions of different users. Material and mediated, yet unstable and ever-changing, archival yet always accessible, transcending the individual yet personalized, connective memory cannot be subsumed under any of the categories used for theorizing pre-digital memory (Brown & Hoskins 2010; Hoskins, 2009a, 2009b, 2011a; Reading, 2009; van Dijck, 2011).

The world without forgetting thesis suggests that as a result of the exponentially increasing volume of digital information recorded and stored on personal, networked and institutional databases, we have 'lost our ability to forget, to unburden ourselves from the shackles of our past' (Mayer-Schönberger, 2009:196), with detrimental repercussions, since forgetfulness is a precondition for freedom. Through its totalization in databases, the past collapses into the present: 'the more memory we store on data banks, the more the past is sucked into the orbit of the present, ready to be called up on the screen' (Huyssen, 1995:253), including information people would prefer to forget (Garde-Hansen, 2009). Externalizing memory to stable objects (recording information, retaining it and retrieving it) used to be costly and complicated but has been made excessively cheap and easy by digitization, hence contemporary individuals and institutions tend to record and retain all information as a default. Unlike biological memory, digital technology resists human attempts to forget and forgive and to shape memories according to the needs of the present (Mayer-Schönberger, 2009).

This allegedly made individuals much more vulnerable to social control and to the despotism of the past itself. The 'tyranny of perpetual memory' threats our happiness and our capacity to develop in new directions (Kallinikos, 2009). Another effect of the accumulation of unforgettable past everyday details is rendering the creation of neat and stable autobiographical narratives almost impossible, as myriad details would always pop up, threating to challenge any coherent narrative (Kitzmann, 2004; Moran, 2002). Even worse, any digitized information may be easily reproduced and disseminated and reappear in the far future, inflicting disproportionate, eternal punishment for minor, trivial deviances. In this world deletion is hardly possible (Blanchette & Johnson, 2002; Mayer-Schönberger, 2009; Solove, 2007). Furthermore, the fact that so many everyday conversations are recorded (as happens in IM, e-mail or SMS) has transformed regimes of

truth, introducing objectified representations of the past (quasi-material evidences) into non-judicial, interpersonal and even friendly contexts. Individuals can thus 'prove' to each other what has been 'really' said (Schwarz, 2011), as people tend to trust digital memory (and objectified false pseudo-evidence in general) more than their own memory (Mayer-Schönberger, 2009; Wade et al 2002).[2]

However, the *flexible memory thesis* suggests that in some senses, digital memory is *less* fixed and stable than non-digital documentation, either because of the dynamics of connectivity that produce dynamic, 'on-the-fly memory' (Hoskins, 2009a), or because it may be easily manipulated in retrospect by algorithms. Thus, photo editing software makes digital photos much more amenable to doctoring than printed photos, and by editing their photos, people may influence their internal representations of the past (van Dijck, 2007).[3]

These three insightful theses do not exclude each other (digitization may well confer on memory-objects malleability, durability, and networked structure simultaneously), and some scholars propagate all of them (van Dijck 2007). Notwithstanding their importance, below I wish to draw attention to a fourth and rather neglected, though no less important, dimension of the digital that shapes contemporary memory ecology. Rather than the sheer volume of digital data-objects or the networked structure of some digital media, I wish to concentrate on one of the fundamental features of the digital that characterizes digital data even in non-networked environments.

In an already-classical distinction, Lev Manovich placed the materiality and the unique logic of the database at the heart of digital culture. 'As a cultural form', says Manovich, 'the database represents the world as a list of items, and it refuses to order this list'. Instead of ordering the list, it subjects it to search queries carried out by algorithms. Manovich contrasts this structure with the *narrative*, in which items are ordered in a sequence of causality. In de Saussure's terms, the database-algorithm compound is paradigmatic, whereas the narrative is syntagmatic.

Below I suggest that the digitization of our objectified memories (photos, correspondences, etc.) means that they are now subjected to the logic of the database. Whereas pre-digital forms of externalized memory such as the photo album were not purely narrative, they did organize the past in a sequence (Kuhn 2010), often a temporal sequence. Thus, order and inscription added narrativity to visual representations. In the photo-album, each photo comes either before or after, close to or far away from any other photo. Contrariwise, digital photos are stored unordered in databases. Each time users consult the database they use one or another kind of algorithms that present to them some of the photos in the database (depending on the search criteria) in a given order (depending on the sorting criteria). In other words, the ordering of digital data-objects is performed every time a new by the algorithm, rather than during the compilation of the archive, as in the case of the traditional photo album.[4] This seemingly technical difference has significant ramifications.

Algorithms have power (Beer, 2009) or actancy (Callon and Muniesa, 2005), and scholars have recently made important progress in revealing the performativity of hidden, opaque algorithms (Bogard, 1996; Bucher, 2012; Marchal, Mellet and Rieucau, 2007; Pasquinelli, 2009; van Dijck, 2011), the 'technological unconscious' (Hoskins, 2009a) that shapes people's life—and memory—without their knowledge, constituting important structural forces. However, as demonstrated below, memory is influenced just as much by the most transparent algorithms.

The paradigmatic nature of the database-algorithm compound has crucial impacts on our relations with our past. It creates what I call a '*plurality of spatial affinities*': unlike material memory objects (such as mementos and letters) that have a fixed, stabilized spatial location, and hence their presence (and absence) may be managed with little unpredictability, the affinity between digital memory objects is created anew with every search query. Almost any attempt to retrieve a single memory-item from a database will actually retrieve an ad-hoc list of items brought together by the search query, and the unintended encounters with items on these lists deserve scholarly attention. Algorithms thus do more than merely contributing to data revocability, accessibility and malleability, that is, supporting human projects of recollection.

However, unlike Katrina Sluis' account of algorithmic memory (Sluis, 2010) I do not suggest that memory accumulation, archiving, curatorship, and retrieval is simply automated and 'outsourced' to algorithms, conducted without human intervention and leaving humans passive and dispossessed of agency. This accounts is misleading for two reasons: first, narratives of outsourcing/grammatization (also Carr, 2010; Stiegler, 2010) essentialize the difference between digital memory and purely internal, organic memory that have never existed (van Dijck 2007. Thus, I doubt whether the 'algorithmic potency of the machine' actually

attenuates the 'meaningfulness that memory confers to life': Kallinikos, 2010). Secondly, as I show below, humans are quite active in creating and using digital memories, although they cannot fully control and anticipate the results of their actions.

Below I first sketch an outline of contemporary digitized memory ecology. Within this context I then focus on the plurality of spatial affinities as a main feature of this ecology, and explore some of its theoretical and practical implications.

Outlines for a digitized ecology of memory

What are the main characteristics of the contemporary memory ecology? First, the externalization and objectification of human memory, which has been subjected to suspicion and criticism ever since Plato, has expanded dramatically as a result of the exponential increase in the number of digital traces and memory-artefacts that contemporary people produce. Digital communication technologies such as e-mail, instant messaging, text messaging or *Facebook* posts—that together represent increasingly large share of interpersonal communication—have rendered ever more interactions co-extensive with the production of documentation data-objects, their accurate protocols` (Schwarz 2011). Digital cameras and camera-phones have vastly increased the share of photographed or filmed moments in people's lives, since many people constantly carry video and still cameras, and may use them intensively without any marginal costs (that is, film development costs). Thus, mundane moments (especially social leisure) are photographed much more intensively than they used to be (e.g. Murray, 2008:156; van House, 2011). Once created, these data-objects are often retained and stored in private and public databases. This increased propensity to intensive digital documentation and data retention (or 'life caching': Reading 2009) results to a large degree from the technological capacity to offer ever cheaper digital storage and communication (Mayer-Schönberger, 2009).

Not only do we produce much more memory objects, we also consume them much more intensively. Whereas in 1982 most families opened their albums only once a year or less (Slater, 1995:138), digital photos are often consumed on a daily basis. Thus, in my studies on digital photography among Israeli teenagers and adults, interviewees reported watching photos and videos to 'fill in the time' (while waiting for a bus, having a few free moments at work, or feeling bored. Also reported in Lehmuskallio and Sarvas, 2008). The same also applies to reading one's own blog. The consumption of personal past has thus turned into a mundane activity, and the constant availability of personal archives supports the emergence of a nostalgic culture, in which young people routinely engage in nostalgic recollection (Schwarz 2009). Intensive engagement with the past has thus become a source of mundane pleasure and amusement.

However, the hedonic search for entertainment or nostalgic pleasure is only one kind of reasons for the intensive consumption of digitized memory objects. A second kind, no less important, is the use of personal (and non-personal) networked and mobile archives for rather utilitarian, goal-oriented pragmatic uses such as recalling particular pieces of information. Increased connectivity often results in the creation of broader networks that tie ever greater numbers of humans and non-humans into an intricate fabric (Latour, 1999). Thus, Wertsch (2002) justly wondered who did the remembering when he used Amazon to recall the full title of a book he wanted to recommend a colleague. The same applies to personal archives such as e-mail accounts: at least since 2004, when Google first offered a 1GB storage and instant search, e-mail accounts have become networked personal archives. Since space has become practically unlimited for most users, they no longer had to delete old sent and received e-mail messages, and could now use their e-mail accounts as external memory to be consulted at will.

Thus, people consult their e-mail, (or their *Facebook* wall) to know when they first met other people, what has been said in past correspondences, or how they thought about an issue back in time. These records of interpersonal communication may thus change people's representations of their personal past: when there is a contradiction between the internal memory and externalized, digital traces, the latter are often privileged as more authoritative 'evidence' (Mayer-Schönberger, 2009; Schwarz 2011)—as we would expect from people living in non-oral societies. Unlike Amazon, Flickr or Google, the e-mail is a *personal* archive: searching one's read mail cannot reveal any e-mail never encountered before. In this sense, searching one's e-mail is much closer to recollection in the traditional sense.

Whereas the tendency to intensively engage in digital self-documentation and in using digital archives as memory aids is not evenly distributed across the general population, increasing numbers of contemporary

people live in an environment populated by an unprecedented number of objectified—and no less important, indexical—representations of their personal pasts, and engage with these representations much more intensively than in former eras (as engagement with memory objects has become integral part of multiple everyday activities—cognitive, reflexive, expressive and instrumental alike). This applies first and foremost to teenagers and young adults in post-industrial societies, and to middle-class employees who work in technology-infused working environments.

The developments described so far were mainly quantitative: people create more memory objects, and consult them more often. However, the new ecology of memory differ from its predecessors also qualitatively—in the status of memory objects and the logics that regulate people's encounters with them. In the next section I suggest that digital memory objects lose their thing-like quality: they cannot be fully predicted or manipulated by their 'owners', they may unpredictably appear in surprising places and times, and (like the photos summoned by the *Photo Memories* widget) compel people to encounter particular aspects of their past. Instead of relations of possession, people's relations with memory objects turn into neighbourly relations. The ability of digitized memory object to surprise their quasi-owners lies in the most essential feature of the database.

The plurality of spatial affinities

> While searching for an old e-mail attachment using keywords, I stumbled upon an old e-mail from 2007, when I was a senior in high school, in which I told a friend what colleges I'd been accepted to. One of the first letters I'd received was from Cal Poly Pomona (the school I am attending now, three schools later).
> 'my parents are so obviously hoping that i'll go to csu pomona. i got accepted into their honors program that will pay 4 yrs of fees! but…pomona. i mean isn't going away the most exciting part of college? my mom was like (forcefully, yet casually), just go there. you're too young anyway and you can't even drive. and we keep having these walking-on-eggshell arguments - no yelling, just quietness with flames underneath. then they say softly, grown-uply: baha la ka… it's this tagalog expression like "so be it" or "whatever you want" but the emotion is harder to translate. it makes me feel like just another clueless rebellious teenager'.
> WTF?! The school I'm struggling to pay for now once offered me free tuition? I TOTALLY REMEMBER NOW. But I really was such an ungrateful little brat with my head in the clouds. I had no sense of personal responsibility, even though I craved the independence. The only reason I'd applied to Cal Poly was to appease my parents, who still wanted me to live at home, a plan I was determined to thwart at all costs, which was why I picked one of the costliest schools to attend for my freshman year, forcing my dad to take out a loan and then pull me out later, much to my bratty self's chagrin. This e-mail just made me wonder how different my life would have been, if I'd never spent my freshman year at a dorm, and then attended community college (...)

This excerpt, taken from a blog of a Californian student, is a good (and quite typical) example of neighbourly relations with memory objects. Stumbling upon an old e-mail, she was surprised to find out information that has dropped out of her internal autobiographical narrative, but remained objectified in the digital archive of her e-mail account. However, once she read it she recognized the truthfulness of the digital representation: that's how it really was. Subsequently, she started wondering what would have happened if she had made a different decision (speculations to which the rest of her post is dedicated).

Blogs are abundant with similar stories of people who searched their inbox for specific information, but then stumbled upon other e-mail messages that made them recall things long forgotten. On a first glance, this isn't really new: long before the invention of computers, objects like old letters reminded people things forgotten, and searching for something in the storeroom or the old files was most prone to evoke such a recollection (*anamnesis*). What is different is the reason this student blogger stumbled upon this particular e-mail: it shared a *word* with the e-mail that contained the attachment she was looking for.

There is no way in which she could have expected that the two e-mails would be stored next to one another, since it was this particular search query that brought them together, realizing one spatial affinity from the plurality of virtual affinities characterizing all digital data-objects. If it were a letter correspondence, than the two letters could either be stored in the same drawer or in different drawers. People

use various criteria to sort their personal material archives, such as creation period (e.g. high-school vs. college); or life-sphere (romantic letters would rarely be kept together with work materials). Whereas material objects have a single location (the shoebox, the third shelf in the storeroom), where people chose to place them, data-objects do not have any single spatial location: they move depending on the query. A data-object is adjacent to any other data-object that shares with it a word, a number, size, creation date or an addressee, and any query reveals different affinities among the infinite set of virtual affinities, depending on the chosen search and sorting criteria.

Geoffrey Bowker demonstrated how this multifaceted classification made possible by digital databases changed scientific systems of classification and knowledge production. Former hierarchical tree classification methods that emulated physical files storage and allocated each classified object a single location in the system have been replaced by tag-based computer-inspired classification systems that place each object in various locations simultaneously, making each data field a potential classification criterion (Bowker, 2005). I suggest that this multifacetedness has implications not only for knowledge production (as in the case of Bowker's virologists), but also for personal memory. The plurality of spatial virtual affinities is what makes digital memory objects so hard to tame.

Digital search can retrieve data instantly: by overcoming the sequential nature of analogue storage, texts should no longer be manually skimmed page by page in order to find information (Mayer-Schönberger, 2009:72-79). However, this despatialization of the archive also means that memory objects no longer have a fixed and stable location. Thus, search query aimed at locating a work-related document may summon an emotionally-laden romantic IM-conversation or the protocols of a family crisis if they only took place on the same day, used the same word or involved people with the same name. Whereas people can and do delete items from databases, they find it harder to control the appearance of objects in response to their everyday usage of search-queries, that is, algorithms.

The example above demonstrates that neighbourly relations don't necessarily imply friendliness. Whereas some neighbours are benign, there are others whom we prefer to avoid, yet all share our with us our living environment and may be incidentally encountered on the street. This applies equally to human neighbours and to mediatized memories. This study case also demonstrates that the neighbourliness metaphor goes beyond the helpful concept of digital memories as 'dormant' memories (Hoskins, 2011b) by suggesting that the reactivation of the dormant memory-objects that populate our digital archives is inherently unpredictable, as it is regulated by the plurality of affinities within the database.

The more past moments are represented as digital data-objects susceptible to search such as photos, videos, e-mail, SMSs or blog-posts, be it on hard-discs or over online platforms, the higher are the chances that they pop-up unintentionally and unexpectedly. Whereas memory has always relied on objects, never were they so many objects and never have they appeared so independently of their quasi-owner's agency.

Ghosts in the living room

What angered the users of *Photo Memories* was an even more radical loss of control over the interaction with one's past. Here users did not even need to place a search query: the algorithm, following rules known only to *Facebook*'s engineers and managers, regulated their encounters with their own memories. This demonstrates well the transference of control over personal memories to corporations like *Facebook* (Garde-Hansen, 2009). However, this is not merely a story of an evil and arrogant corporation experimenting in new ways of increasing incomes without accounting for the impacts on users' lives, as the media framed it. It is also a story about individuals losing control over how and when they engage with which representations of their own past, that is, memory—control now taken over by the agency of algorithms.

In the material world, people furnish their everyday lives with photos they put on walls, mantelpieces or office pinboards (Halle, 1993; Slater, 1995). These photos are important, not only as statements for others: people use them to act upon themselves emotionally, and engage with them in highly embodied manner (Rose, 2003). However, these photos are chosen very carefully. David Halle has documented long ago the taboo on presenting ex-partners' photos in the living space: these must be removed following the divorce (Halle, 1993). When not destroyed, they are transferred into less easily accessible places, where they cannot be encountered unintentionally.

This purgatory is what Kevin Hetherington called 'first burial'. For Hetherington, 'disposal is about placing absences and this has consequences for how we think about "social relations"' (Hetherington, 2004:159). Through 'first burial', things (including memory objects) are placed in a less accessible place, often because they still retain some emotional value. They are thus removed from the everyday without being disposed of, at least until their owners tidy up the attic and decide they deserve a second, final burial. Until then, disposed objects remain at their owner's disposal and are not destroyed, yet they can only pop up once their owner enters the storeroom. Thus, disposal is also about the management of memory and forgetting.

What was so unusual and irritating about *Photo Memories* is that here an algorithm decided for users which photos will be moved from the storeroom to the mantelpiece. Like ghosts, these representations of the past have become capable of walking through walls, and appear—without being intentionally summoned—in the symbolic 'living room' of their profile page (or even worse, in the more intimate space of the bedroom, while connecting to *Facebook* from the bed. What makes digital memory uncanny or ghost-like (cf. Garde-Hansen et al. 2009:6; Hoskins 2011b:19) is its capacity to move independently of direct human agency. It is search and sorting algorithms that summon them. However, whereas the ghosts metaphor stressed the uncanny quality of their unpredictable appearance, the neighbours metaphor reminds us there is nothing supernatural about it: the objectified past representations densely populate our living environment and are not as thing-like as they used to be.

Other computer programs such as *Google Photos screensaver* offer individualized (and often non-networked) versions of *Facebook*'s *Photo Memories*. These programs randomly choose changing photos from one's hard-disc (and possibly online photos) and show them in a sequence on one's computer or television screen. One young adult interviewed for a wide research project on digital photography told me how friends who visit him often stop in front of his computer screen while surprisingly encountered with mementos from their own pasts appearing on his screensaver. Another one told me these random photos on his television screen have a 'mesmerising effect' on him. He especially likes watching beautiful nature pictures that he took while hiking, but is less delighted whenever photos of his or his wife's ex-partners appear on the screen, despite their attempts to exclude them from presentation: having many thousands of photos, there are always more painful or otherwise undesired memories to weed out. Another interviewee reported watching random photos while ironing. These included some unpleasant photos such as those of friends who died; as well as traffic accidents, since he worked as a paramedic and took photos for documentation and instruction. However, he believed no photo should be deleted, as the past must be truthfully represented. Loyal to this ethic, he never knows which moments he would meet tomorrow.

Whereas this ethical standard may seem unusually strict, sharing with algorithms the control over the interaction with memory objects is anything but unusual. Stumbling upon unexpected data while searching one's e-mail box is a common experience, as many bloggers attest. Since late 2009, the standard Microsoft operating system (Windows 7) includes built-in instant search feature that indexes all files, making them similar to e-mails in this respect. Blogging platforms also enable bloggers to run search queries over their own (and their friends') online diaries.

To conclude, the media environment we live in may be characterized by:
a) larger personal archives of memory objects, since an unprecedented large share of people's social interactions are objectified, leaving behind them digital vestiges;
b) increased use of these memory objects for human projects of memory and recollection, for various uses, both hedonic/nostalgic and instrumental;
c) unpredictable encounters with memory objects that transcend these projects, shaped by the actancy of algorithms that regulate people's relations with their personal archives; and
d) the plurality of spatial affinities inherent to the paradigmatic structure of the database, in which objects may be searched according to any data or meta-data criterion. Any memory object is thus located in proximity to an infinite number of other data-objects, and may appear whenever any of these objects are searched for.

From Aristotle to Latour

The convergence between intentional and unintentional encounters with representations of the past challenges the classical philosophical distinction between memory and recollection, remembering and

recalling. For Aristotle, *anamnesis* (recollection, the conscious and purposeful attempt to recall specific information) is an active process of search, which is unique to humans; whereas *mneme* (the state of having an image of the past, to which one attends qua representation of the past) is a passive mental state common to people and other animals (Bloch, 2007; Ricoeur, 2004). Unexpected encounters with material objects, such as Marcel Proust's madeleines, usually function as triggers for 'simple evocation' of *mneme*, as they make people attend to their memories (Ricoeur, 2004). In digital search over personal archives, people seemingly engage in *anamnesis*-like act (the purposeful search after information they know they once had), but for the fact that instead of searching their internal memory they search an external, digitized memory. However, the intentional search for information converges with a different kind of encounter, in which algorithms introduce the user with various other information pieces that would usually not be linked with the desired data by association in her internal memory. Thus, neighbourliness puts an end to the alleged essential incompatibility of the archive with Proust's involuntary memory (Ernst, 2004).

In cases such as the Californian student's, the active attempt at recalling ends with the 'simple evocation' triggered by the search result, and shaped by the structure of the database and the search algorithm. Rather than instrumental usage of external memory, the unproblematic realization of pre-existing human intentions, digitally mediated recollection becomes a two-phase temporal sequence: after trying to actively use the search engine as a *tool* for her memory projects, the user is subsequently subjected to the power of the search results to expose her to memories that may work upon her (by evoking affect or widening her knowledge) in unpredictable ways (cf. Gomart and Hennion, 1999).

While blurring the distinction between active recollection and passive evocation of memory by chance encounter, digitization also changes people's experience of their own agency and that of technology.

In his famous philosophical critique of the subject-object distinction Bruno Latour suggests that 'purposeful action and intentionality may not be properties of objects, but they are not properties of humans either. They are the properties of institutions, of apparatuses, of what Foucault called dispositifs' (Latour, 1999:193). Thus, instead of talking about the agency of subjects who use material objects as media, mere neutral carriers of human will (Latour, 1999:177), we may talk about different 'actants', human and non-human, who shape action collectively (Latour, 2005). However, as long as the final action is similar to what people have expected it to be, people may keep experiencing themselves as subjects using technological tools to realize their goals or 'projects': predictability enables people to blackbox the network, ignoring the contribution of non-humans to the production of both the action and their own will.

Things cease to be 'thing-like' when something goes wrong—when as a result of the actancy of non-humans, the action surprisingly deviates from its expected path, that is, from what people experience as the realization of their intentions (cf. Dant, 2004; Latour, 1999). Whereas our relationships with our past have always been shaped by the material world in various ways, I suggest that digital memory objects are less 'thing-like', less easily blackboxed, because too often our interactions with them cannot be easily tamed: they remain unpredictable and lead to unpredictable results from the perspective of their quasi-owners. Our failure to tame them is not contingent (as if they haven't *yet* been tamed), not merely the result of a flawed design (as in van House and Churchill, 2008), but immanent: digital memory objects cannot be fully tamed because of the very nature of the database-algorithm compound.

In the traditional sense, people create their personal archives as projects of self-documentation (Kitzmann, 2004) and treat these archives as their *property* that stands at their disposal for various uses. People use these archives for emotional purposes (coping with longing or loss by consuming photographic representations of those absent: Baldassar, 2008); informational purposes (establishing autobiographical facts by consulting the diary or the photo-album); or presentational purposes (sharing one's life-story with a new significant other, or presenting the self to friends of friends on social network sites). These uses have become more common since digital personal archives have become constantly available (on the mobile phone's memory card or over the internet), as documented in multiple studies. In these cases photos are tools in human projects of remembering, recalling, and using the past as a resource in the present. In Latour's terms, these are acts of delegation of human agency to non-humans. However, as shown above, this is only part of the story.

Meet your neighbours

Digitization changed the status of our relations with memory object in a way that renders the ownership metaphor inadequate. A more apt metaphor would be 'neighbourliness'. As ever more past moments and interactions are objectified, they turn into quasi-residents in our neighbourhood: we may encounter them incidentally, like the neighbours we may meet on our way to the grocery-shop, and like these neighbours they may 'act upon us' in these incidental encounters, e.g. by telling us things we didn't know. These neighbours populating an actor's memory-environment include data-objects produced by both the actor herself and by others.

As shown above, old e-mails from high-school time is not as thing-like as old letters stored in the attic: having them stored on the same e-mail account used today is more similar to living in the same neighbourhood with a nostalgic high-school friend who can always meet you in the subway station and indulge in reminiscing. Similarly, the e-mail correspondence with one's ex-partners or their digital photos are not passive possessions. Living while having them in the database is rather similar to living a few blocks away from the ex-partner's best friend, who cannot be encountered without evoking memories. Whereas this metaphor, as any metaphor, should not be taken too literally, memory data-objects are similar to neighbours in the sense that they populate people's everyday environment, and that they may be encountered in unexpected times and places. Whereas the possessive dimension of the relationships between people and their personal mnemonic archives has not ceased to exist, the new dimension of neighbourly relations is unique to the digitized ecology of memory, in which the encounters between people and representations of their past is mediated by algorithms.

As our past has become more intensively objectified, and as its representations started moving through walls rather than stay where their 'owners' have stored them, the effects of digital memory aids cannot be stabilized in a way that blackboxes the heterogeneous apparatus that control them, hence they can no longer be conceptualized as mere tools. Instead they became neighbours or ghosts of the past that populate our living environment. The gap between actor-network theory and lived experience is then erased, as lived experience can no longer be reconciled with the world of Aristotle: it is the world of Latour in which we live, the late-modern world in which networks become larger and more complex, enlisting ever more humans and non-humans, and linking them into an ever more intricate and thick networks or imbroglios (Latour, 1999:195-7).

Conclusions

It has become common-place that the digital network era made forgetting much harder: as the 'world without forgetting' thesis suggests, when data can be easily disseminated and replicated, it cannot be easily destroyed. As I've demonstrated above, not only forgetting, but also first burial, applying control over the availability of the past, becomes a challenging task. Our memory does not rely merely on bodily neuronal networks and material objects, but also on the structures of database that store the growing number of digital memory-objects; and on the design of algorithms that mediate their retrieval, i.e., the structure regulating our interaction with them.

This is the paradox of digitization: on the one hand, the past is ever more objective, objectified in fixed and stable data-objects. This fixity is what makes digital traces of the past on personal archives (such as personal photos and emails) so useful as evidence for organizations such as the state, courthouses, corporations and intelligence agencies (Graham and Wood, 2003; Mayer-Schönberger, 2009; Wilson, 2007). Unlike internal memories, which are rewritten each time they are accessed (van Dijck, 2007), these objects are fixed and cannot transform unintentionally. On the other hand, the locations of these objects are ever *less* stable. Hence, the objectified, stabilized past may pop-up unexpectedly: memories other than those we wish to recall may appear whenever we let algorithms choose photos for our desktops, help us search our hard-disc, our e-mail account or our blogs; or whenever we allow algorithms access to our personal archives, as happens in social network sites such as *Facebook*. These stabilized memory objects thus work upon us in unexpected ways that sometimes destabilize our already stabilized internal biographic narrative, as in the case of the student blogger discussed above.

The multiple digital memory artefacts that populate our world are not merely *tools* for anamnesis (initiated by human subjects), but *memory-actants*: they partake in shaping our relations with our past, which is, memory. This new temporality deserves its own language. We can no longer conceptualize memory as the

work of human subjects using docile objects. Instead, social scientists who study memory should acknowledge the limitations of the ownership metaphor, and seriously consider the metaphor of neighbourly relations.

My suggestion that the logic of the algorithm has reshaped people's relationship with their personal and collective pasts has at least three important implications for future research:

First, we should think of algorithmic search as a memory site: not a tool that helps users find the information they seek, but rather an architectural structure that shapes and regulates the incidental encounters of users with representations of their past. Thus, a whole bunch of highly common mundane practices may be reinterpreted as *memory practices* that share with commemoration rituals, diary keeping and monuments much more than would appear at first glance.

Second, thinking of memory in terms of the structures of people's engagement with their past may be fruitful beyond the narrow context of algorithmic search. Sociologists have long maintained that the chances of having friends or spouses of different backgrounds are shaped not by individual preferences alone, but by the 'structure of opportunities' that regulates the chances of encountering members of different groups: residential segregation and urban planning thus shape people's social network (for an classical formulation: Blau & Schwartz, 1984). Access to information is also structured: the huge scholarship on the digital divide suggests that the internet may increase inequality. Social network scholars suggest that some people have easy access to information, whereas others need the help of mediators, a fact that informs power inequalities (Burt, 1992). The metaphor of neighbourly relations reminds us that just as the chances of running into a person depends on where we live, what transportation we use, and when we are more likely to be out—so are the chances of meeting a ghost of our past, a digitized memory object, depend on *material and informational structures*. Today algorithms shape and regulate not only the *social* visibility of others, and of the self to others (Bucher, 2012; Pasquinelli 2009), but also the visibility of the past, which is, memory. Encounters with memory objects are not truly 'chance encounters' (they are fully determined by the algorithm and the search query, whereas 'structures of opportunities' that structure offline encounters are merely statistical in nature), yet they are *experienced* as chance encounters, since they cannot be predicted by the agents involved. This is so simply because of the obvious differents between human brains and computers. Search engines thus offer a more anthropic structure than the attic. However, the particularities of different technological designs and the ways these different designs inform cultures of memory are yet to be studied. People's engagement with their personal (and collective) past is informed by structural factors not so different than people's engagement with other people or with information.

Last but not least, the language of the 'art of memory', of memory technologies and mnemonic techniques that implicitly embraces the subject-object dichotomy should be replaced with a language of interobjective sociality, in which humans and non-humans encounter each other and work on each other. Not only is this language theoretically sounder, it may also represent better the lay experience of those living in digital environments, whose everyday lives are influenced by algorithms in myriad ways.

As we leave behind us ever more digital traces, stored in databases that refuse to order them, their docile thingness diminishes. As they meet us by surprise and walk through the walls of our homes, the metaphor of neighbourliness may offer a sounder foundation to conceptualize the future of the past.

Acknowledgements

Notes

1. The notion of memory ecology relies on the assumption that memory is shaped by material and cultural structures in general and by media ecologies in particular. For further discussion: Brown & Hoskins, 20l0; Hoskins 2011b .

2. Other scholars suggest that once memory is digitized, both inability to forget *and* inability to remember or recall may result from flawed design: van House and Churchill, 2008.

3. Digitization may also destabilize memory by increasing the volume and the indexicality of memory objects, offering enough details to reorganize them into new narratives in the future, cf. Kitzmann, 2004.

4. Early computers were modelled after material filing systems, and most people still organize their data in separate folders. However, new designs of computer operating systems and e-mail platforms (discussed below) encourage intensive use of algorithmic search at the expense of investment in meticulous archiving. Also see Bowker, 2005. Whereas *Facebook*'s montage seemingly offers simple linear narrative representations (Garde-Hansen, 2009), these are mere facades that cover complex algorithms.

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