4 How Memory Comes to Matter

From Social Media to the Internet of Things

Elisa Giaccardi and Liedeke Plate

Introduction

'The Internet of Things (IoT) … will change everything—including ourselves' (Evans, 2011, p. 2). Thus opens a recent white paper on the emerging capacity of the Internet to connect objects in the physical world to online databases and enable them to collect and exchange data. This chapter reflects on these developments from a heritage perspective and critically discusses how the Internet of Things has begun to change the complex set of memory practices through which we give meaning to the past in the present and thus shape our image of the future. It contributes a critical account of pioneering heritage work from social media to the Internet of Things, with the goal of helping scholars and practitioners frame and design future technologies of memory. To this end, the chapter first considers the ways in which social media enable ordinary people to participate in the construction of cultural memory through shared online activities of collection, preservation, and interpretation. As discussed in *Heritage and Social Media* (Giaccardi, 2012), social media encourage a shift in heritage work from the mere safeguarding of material artifacts to the grassroots, human practices through which heritage objects are interpreted and valued—from online practices of remembering together on Facebook to the remix and mash-up of user-generated online content within and beyond the museum exhibit. In this chapter, we expand on this consideration and argue that a participatory approach to memory practice empowers people to an active, creative relationship with heritage objects: 'doing' or 'saying' around the object begins to become more important for human practices of remembering than the object in its straight materiality.[1] With social media, memory is not just communicated to a 'passive' receiver of information, but is actively constructed and performed through participatory practices of remembering. For digital heritage, traditionally concerned with the digital preservation of material artifacts, this is an important step (Russo, 2012). But it is only the first one.

We then move to examining how the Internet of Things gives new frontiers to the active, performative relationship between people and memory objects that social media have introduced into digital heritage. Connected to the Internet, a material artifact may know, for example, where it has been and with whom, and have the same knowledge about other artifacts within the same network. Connected artifacts are embedded with software, networked to online databases and cloud services, increasingly equipped with sensors and actuators enabling them to sense and physically act upon their environment, and are operated by algorithms performing data processing and automated reasoning. A classic example in consumer electronics is the 'smart fridge', which sends a notification to its owners' phone informing them about the grocery items they need and their location.

As illustrated by the heritage projects in this chapter—from dancing shoes stickered with memories of the Scottish dancing hall culture to photo printers reminiscing on their own—'doing' and 'saying' around connected artifacts does not just happen online. It happens in the social and environmental setting in which the material artifact is physically encountered, in situations uniquely informed by the shared practice that develops *with* and *through* the artifact. In the Internet of Things, these performances are carried out within a socio-material configuration in which memory objects are both tangible because embodied and localized in potentially always new ways, and intangible because embedded with code, instructions, and interaction histories. As memory objects begin to be constituted with code and algorithms, and to remember more about themselves and, likely, about ourselves in ways made easily accessible to ordinary people by data storage, we argue that 'doing' and 'saying' around connected artifacts creates new spaces of remembrance. This new relationship with 'things' is something that we may increasingly have to negotiate, and we believe it is the next step in digital heritage.

The chapter therefore concludes with a theoretical speculation on how shared practices of remembering between humans and nonhumans have the potential to create spaces of remembrance that challenge our anthropocentric understanding of what is 'possible' and 'worthwhile' to remember. Humans have used material artifacts as *aide-mémoire* and things have functioned as (involuntary) reminders since time immemorial. But as memory objects around us begin to exhibit autonomous forms of agency, to what purpose do they 'remember'? And for whom will they recollect?

Problematizing Materiality in Human Practices of Remembering

Human practices of remembering are as much about artifacts as they are about performances. This insight was first brought to heritage studies by scholars such as Thomas (2004), Lowenthal (2005), and Byrne (2008).

Their work helped us to understand how we socially construct heritage in the context of our own lives and imaginations to interact meaningfully with our past and shape our vision of the future. Whether museum artifacts, historic buildings, private memorabilia, scrapbooks, the collective storytelling of historical events, or the enactment and reification of a living connection to land—heritage is not just about preservation; it is about making sense of our past and developing a sense of identity. Moreover, as heritage scholars such as Laurajane Smith in *Uses of Heritage* (2006) and Susie West in *Understanding Heritage in Practice* (2010) have shown, heritage is defined more by the cultural work of ordinary people than by official heritage organizations. This fundamental understanding emphasizes that heritage meanings and values are neither inherent nor attached to artifacts, buildings, or sites. Nor are they frozen in time. They are the results of repeated and ongoing interactions in the lived world of ordinary people, emerging from their dealings with artifacts, places, and practices, and thus forming 'chains of connectivity' in which humans and nonhumans are linked and 'work together to keep the past alive in the present for the future' (Harrison, 2013, pp. 4–5).

In the same way, research in digital heritage has moved past concerns of digitization, preservation, and communication only (Van Dijck, 2007). Over the last decade, researchers in the field have started to investigate how to use digital technologies to engage museum visitors in other ways than simply as receivers of information. For example, at the Hunt Museum in Limerick, Ferris et al. (2004) designed a pioneering interactive studio where visitors could explore stories of unknown museum objects and leave their own interpretations. At the Bunratty Folk Park, the same research group invited visitors to move physical artifacts from one place to another and used this mechanism to invite visitors to record and share their comments and reactions in real time (Ciolfi and McLoughlin, 2012). Similarly, for a major exhibition of John Constable's work at Tate Britain, an interface revealed the underlayers of a painting only if multiple visitors stood in front of it, thus fostering a form of collaboration among strangers (Vom Lehn et al., 2007). Fosh et al. (2013) used mobile devices to provoke visitors to look at and actively perform around the sculptures of Rufford Abbey's grounds, with the goal of supporting multiple trajectories of interpretation. And Warpas's design interventions at the Bantock House Museum (Warpas, 2014) used digital technology to animate neglected museum objects, invite children and their families to establish an emotional connection, and develop their own interpretation of the artifacts displayed behind glass.

Social media accelerate this understanding of heritage as cultural work of engagement and interpretation and provide a permanent platform for practicing memory through digital means. As argued in Giaccardi (2011), social media move beyond the 'pause' represented by the fairly

brief moments of the visit to the museum or heritage site. By fostering mundane activities of collection, preservation, and interpretation of a broad variety of memory objects, social media enable ordinary people to 'arrange and rearrange their interpretations in always new orders of meaning' (Giaccardi, 2011, p. 37), both collectively and in the context of their own lives.

According to Jenkins and colleagues, a participatory culture is one in which 'not every member must contribute, but all must believe they are free to contribute when ready and that what they contribute will be appropriately valued' (2009, p. 6). A participatory culture values how engaging socially in creative activities changes the way we think about the others and ourselves. As emphasized in Jenkins, a participatory culture is not just about producing and consuming content; it is also manifested through diverse forms of affiliation, expression, and collaboration. In such a culture, argues Shirky (2008), people feel socially connected to one another, all the time. They also create a sort of 'cognitive surplus' by aggregating their free time and harnessing it for large, collective projects (Shirky, 2010). Of course, participatory cultures are not new. The Amateur Press Association of the middle of the nineteenth century is perhaps one of the most widely known historical examples. However, we are witnessing today a broader and more profound phenomenon, where digital social networks open up the margins of participation to potentially larger and more heterogeneous groups of people.

In digital heritage, we find examples of a growing participatory culture in grassroots, ordinary and everyday online memory practices as well as in museum settings. *Digital Natives* is an exhibition held at the Aarhus Centre for Contemporary Art in 2010, where social media streams, such as mobile updates, pictures, videos, and music playlists were combined with a participatory design process to let youngsters born with digital technologies represent themselves to future generations. Designed by Iversen and Smith (2012), the exhibition project uses social media to open up the boundaries of the museum visit and help create living connections between the everyday lives of digital natives and their audiences.

Launched in 2010 and initiated by the Danish government, *1001 Stories of Denmark* is a similar online platform where people can share online their knowledge and memories of Danish heritage.[2] The project invites everyone to explore their favorite places in Denmark and share their experiences. People can use the uploaded stories, images, and videos to be inspired by others and create their own travel routes. Another example is the early social media platform *Silence of the Lands* designed at the University of Colorado at Boulder in 2005 (Giaccardi, 2007), which encouraged local communities to share personal memories and experiences of the natural heritage through the sonic filter, and learn from each other in new and unexpected ways. Similarly, the commemorations organized

via the Internet to remember the deadly gas leak that took place in a Union Carbide plant in the city of Bhopal, India, in 1984 (Liu, Palen, and Giaccardi, 2011) attempt to forge an historical present where people who did not participate directly in the event attend in their own 'ordinary' time and place to memories of social injustice and mass violence.

As illustrated by these examples, memory is not just communicated to an audience of visitors but is actively constructed and performed by ordinary people, enabling new kinds of 'co-memorations' (Burke, 2010). Social media empower people to forge an active, creative relationship with heritage objects. As a consequence, 'doing' or 'saying' around the object begins to become more important for human practices of remembering than the object per se. Rather than being concerned with the object's materiality and how to preserve it, what matters now are the long, meaningful connections with one another that ordinary people can create in 'ordinary' time and place—that is, in the everyday.

The guerrilla street art project *Moving People* (2015) by Dutch artists' collective Power of Art House is a dramatic illustration of how these meaningful connections may come about. In the fall of 2015, the artist collective placed 10,010 miniatures of refugees in various public spaces in Amsterdam and The Hague (the project was repeated in Ghent (Belgium) in the spring of 2016). The miniatures are modeled onto the 3D scans of real refugees, with a web address printed on each of them. The project aims to encourage empathy and strengthen social cohesion. To this end, the miniatures in the street allow those who stumble upon one of them to suddenly encounter the personal memories and stories of the refugee associated with the replica. Miniatures can then be carried to another location, and the experience of such encounters can be shared through social media.[3] The project focuses on the idea of shared humanity; the miniatures themselves are mere excuses for civic engagement and creative participation: they may be taken home, and if found broken, one can simply repair them (Figure 4.1). Sustaining new civic rituals, *Moving People* is exemplary of a generation of grassroots, 'bottom-up' practices of remembering together, spread over a multitude of social media platforms and designed around the performance of memories (Plate and Smelik, 2013). Through a socially distributed process of curation of personal accounts, shared images, and shared political actions on Twitter, Facebook, and Instagram, new 'co-memorations' take place and countermemories are created and performed.

Problematizing Agency in Practices of Remembering between Humans and Non-humans

Now, what happens when even the most mundane objects begin to remember their lives, to speak of where they have been and what they have seen and heard?[4] What happens when objects, too, begin to 'do' and

Figure 4.1 Moving People is more about shared humanity than about the materiality of the object. Photograph placed on Facebook by Wing-Ka Chung, 16 September 2015 (https://www.facebook.com/powerofarthouse).

'say' and to establish connections—perhaps even do so independently? What happens, in other words, when objects begin again to matter (and do not only function as mere material support for human practices of memory)? More than 2 billion people use the Internet today to share data and communicate through different online media (Kende, 2014). Cisco predicts that 50 billion devices will be connected to the Internet by 2020.[5] Mundane artifacts such as cars, refrigerators, and washing machines but also clothing, shoes, and all sorts of 'wearables' will be a growing portion of the connected devices *with* and *through* which we will interact and communicate in the everyday.

Connected to the Internet and able to collect and exchange data, mundane objects become 'things'. The phrase Internet of Things is attributed to the Auto-ID research group at MIT in 1999 (Ashton, 2009) and refers to the emerging technological system of objects and materials that are becoming connected to the Internet. As argued by Richard Coyne (2011) and Tim Ingold (2012), here the 'thing' is not the object in its straight materiality but 'a gathering': specifically, a gathering of data, connections, and interactions to deliberate on an issue that matters. For example, a 'smart fridge' is not simply a physical artifact with reasoning skills. Connected to online databases and operated by algorithms,

a fridge is a 'thing' that not only sends notifications to your phone but also makes informed judgments and helps you deliberate on what needs to be bought (Kuijer and Giaccardi, 2015).

This paradigm is producing a shift in how material artifacts are valued, interpreted, and operated. Many contemporary material practices across the fields of produce are beginning to develop artifacts with intangible counterparts: from old-fashioned barcodes and instruction manuals to connections to social media sites. In general, the relationship between these two parts—tangible and intangible—is largely passive. So far, many Internet of Things projects have used the Internet connection of artifacts to identify cost saving and process efficiencies (for example, vehicle manufacturers), to track goods within large networks (logistics companies, among other) or to monitor the health and safety of systems (for instance, aircraft manufacturers) within a streamlined process of production. But as connected objects become more common, argue Giaccardi, Speed, Cila, and Caldwell in a critical account of the Internet of Things (2016), the massive amounts of data that they collect will soon outweigh what we know about these objects—and thus about ourselves.

With the Internet of Things, connected objects develop the ability to remember their lives, to speak to humans of where they have been and what they have seen, heard, and experienced. As Chris Speed argues, 'As they [objects] move from one place to the next, they will gather mobility data; as people interact with them, they will gather social data; and even as they sit idly on a shelf, they may well be gathering data about the objects that are around them' (2012a, p. 194). Rather than using things to communicate with other people, then, people will communicate with things and things with people—and with other things. Within this landscape, the ontological distinction between human and nonhuman, and animate and inanimate becomes blurred.

What does this do in relation to memory? As humans devolve more tasks to things, and as human and nonhuman actors mix increasingly (Olsen, 2010; Ingold, 2012; Kuijer and Giaccardi, 2015), what happens to memory and to how 'we' remember? Humans have always used things to help them remember, and these things shape both how and what we remember (see Plate and Smelik, 2009). Plato was already concerned that writing would atrophy the human capacity to remember, and present-day doom-thinkers worry that we have 'been allowed to dedicate much more of our cognitive resources to active RAM than to maintaining our cerebral-storage hard drives' (Rushkoff, 2013, p. 5). Mnemotechnics such as the knot in the handkerchief—by which people sought to re-member to remember (usually, to do something)—disappeared with the emergence of the disposable tissue, while the mobile phone and, later, the smartphone made that their owners no longer remember (nor need to remember) the phone numbers of regular contacts. Rather than thinking

of such 'things' as *aide-mémoire*, should they not be viewed as integral to how people do memory?

In material cultural studies, it has become commonplace to speak of the agency of things. As anthropologist Daniel Miller puts it, 'Things do things to us, and not just the things we want them to do' (2010, p. 94). Feminist philosopher and theoretical physicist Karen Barad postulates that people and things constitute each other in the process of coming into being, that is to say, 'intra-actively'. This concept makes the idea of things as having agency relevant to the discourse about memory. According to Barad, agency is not something that people or things have; it is the emergent result of how the world continuously configures and reconfigures itself. Matter thus is 'a congealing of agency', 'a doing', 'a stabilizing and destabilizing process of iterative intra-activity' (2003, p. 812). In this light, 'the universe does not have memory, it is the memory of iterative materializations. This suggests that there's a sense in which even molecules and particles remember what has happened to them' (Barad, Juelskjaer, and Schwennesen, 2012, p. 21).

Such a view of memory accords well with neuroscientific accounts. According to neuroscientists, memory is constructive. Remembering is a creative process in which memories are re-created each time they are recalled—'iterative materializations', in Barad's terminology. Rather than 'consolidating' memory, as recall was long thought to do (Silva, 2010), remembering actually destabilizes memories. The conditions under which recall takes place affect this process. Neuroscientists Joseph LeDoux and Valérie Doyère have shown 'how the reactivation of a memory trace renders it unstable and prone to modification' (Craver, 2015, p. 120), and neuroscientist Alcino Silva maintains that 'interfering with consolidation mechanisms during recall weakens or even erases these memories' (2010, p. 48).

The emergent view of memory mechanisms as 'designed, not for accuracy and permanency, but instead, for constant editing and fine-tuning of information with experience' (Silva 2010, p. 49) changes the common view of memory and what its functions are. Memory's 'susceptibility to many internal and external factors that constantly update, change, edit, and even bend fact to self-serving fictions' (Silva, 2010, p. 47) also makes clear that memory is best understood as 'intra-action', to use Barad's neologism: 'particular material (re)configurings that stabilize and destabilize along specific material changes' (Barad, 2003, p. 818).

Social media enable this constant editing of memory. Through social media, people recall and establish meaningful connections in 'ordinary' time and place, beyond the brief moments of the visit to the museum or heritage site. Online communities are formed that engage in shared practices of remembering; as part of such communities, people 'do' and 'say' around any object to which they ascribe social significance. These objects help them read the past, make sense of themselves in

the present, and write how they want to be remembered. But with the Internet of Things, things also begin to 'do' and 'say'. Embedded with code, instructions, and histories, they recollect, establish connections with other things and with people, and can actively participate in the construction of memory.

Bringing Memory to Matter with the Internet of Things

Experimental prototypes and speculative concepts that use the Internet of Things to transform practices of remembering bring two points to the fore. The first concerns implications for memory practice of how connected objects, or 'things', come to be situated within a specific social and material context. Their different embodiments are the result of different socio-material configurations—that is, of the different ways in which the connection between the localized materiality of the object (i.e., what is it, and where is it or where it has been) and its intangible counterpart (i.e., code, instructions, histories) has been designed. This is rarely a symmetrical relationship. The second point concerns the ways in which the 'agency' of things and their participation in shared practices of remembering change our ability to interpret the past and project the future, potentially opening up contested or unexpected spaces of remembrance. As expressions of agency vary with the autonomy of the connected object (from vessel to actor), practices and spaces of remembrance differ, too.

Of Vessels and Meaningless Artifacts: Attaching Memories to Objects

What can a dancing shoe remember of the past? When we consider old things such as Rembrandt paintings, antique artifacts, and heirlooms, we are quite familiar with the value that details of their provenance add to the object. Yet when it comes to ordinary artifacts, we are less used to recognizing that they, too, have 'lives' and that the information conveyed by their 'biographies' is valuable. Marxist and neo-Marxist theorists have long insisted on the ways in which consumer culture eclipses the memories of the social relationships involved in the commodity's production (Barthes, 1957; Bourdieu, 1977; Appadurai, 1986; Kopytoff, 1986). We argue that the Internet of Things helps counteract the 'genesis amnesia' of the commodity (Bourdieu, 1977, p. 79) by reconfiguring the connection among people, the materiality of the artifacts, and the stories we tell about their provenance and significance. In this first set of examples, this is achieved by enabling people to permanently 'attach' memories to the physical object in the form of textual narratives, photographic images, or video clips, and to retrieve these memories at any moment with the aid of a smartphone. Though the perspective is still that of

the human who tells the story of the object, once connected, the object begins to actively support an unprecedented 'read/write' relationship. As the object is passed on and stories grow and stick onto it, its significance is transformed and possibly contested. People are encouraged to 'write back' and contest the veracity of any memory that is presented to them, thus opening up space for alternative associations and histories within the specific social and material context in which the object is situated. Memory is at the same time 'stabilized and destabilized' along the specific material changes to the data which are attached to the object (*Tales of Things*) or vice versa, along the material changes to the object that is associated with the data (*The Earthquake Shelf*).

Tales of Things (Speed, 2012b) is an early Internet of Things platform from the Centre for Design Informatics of the University of Edinburgh that uses the properties of connected objects to offer alternative associations and pasts.[6] The platform enables people to print a paper tag, stick it on a material artifact, and use the Tales of Things app to attach to the artifact memories to share with others. People can tag an ordinary object with a QR code, and this code will link the object to an online textual narrative, photographic image, or video (Figure 4.2).
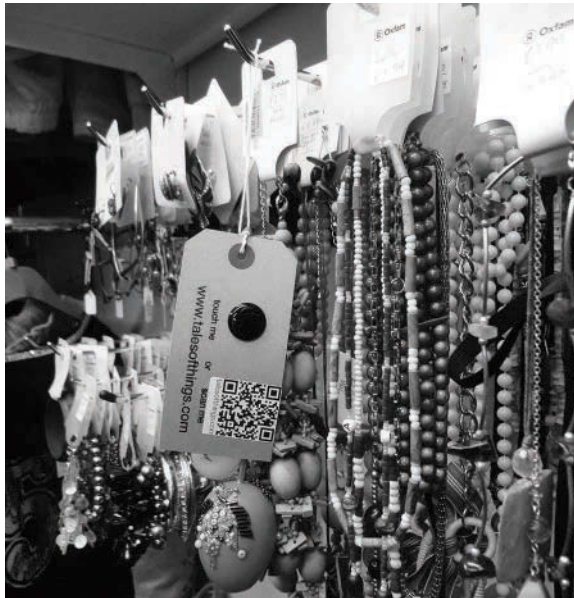

Figure 4.2 *Tales of Things* allows attaching personal memories onto ordinary artifacts (http://talesofthings.com). RememberMe at FutureEverything 2010: tag attached to jewelery in Oxfam shop, Manchester. Photograph by Jane Macdonald, 2010.

Once scanned, the object will link the audio or video stories that the person has associated with it and help recall. As suggested by studies on the role of storytelling in history (Steedman, 1986, 2001; Leydesdorff, Passerini, and Thompson, 2005; Giaccardi, 2006; Speed, Khan, Baurley, and Phillips, 2015), personal accounts about particular artifacts may help correct erroneous historical assumptions about events of the past and challenge what counts as evidence. Ordinary tales can thus help a piece of history emerge, and can change the social significance and value of a particular material artifact. These memories are like the odds and ends found when one empties out one's pockets. Physically holding the object and experiencing it within the social context in which it is situated powerfully support the 'read/write' relationship enabled by the connected object.[7] However, connected objects can push this 'read/write' relationship beyond the 'particular' material artifact. *Tales of a Changing Nation* (2011) is a design intervention at the National Museum of Scotland in Edinburgh that uses the *Tales of Things* platform to let visitors attach personal memories to 80 objects from Scotland's history in the twentieth and twenty-first centuries. These objects had been painted in white to accrue a wider variety of social memories.[8] The use of white 'ghost' objects in the National Museum of Scotland grants mobility to memories, allowing them to be recovered from the past as a recollection and then transferred to the ghost object via the use of paper tags (Figure 4.3).

According to Waldner (2007, qtd. in Speed, 2012a), people in general surround themselves with between 1,000 and 5,000 objects, many of which are discarded and replaced through consumption and subsistence.

Figure 4.3 Ghostly vessel of a dancing shoe with accrued social memories in the *Tales of a Changing Nation* exhibition, National Museum of Scotland, Edinburgh, 2011. Photograph by Jane Macdonald, 2010.

Figure 4.4 Memory of earthquake changes the materiality of the artifact in the speculative *The Earthquake Shelf* project (http://markmakedo. co.uk/portfolio/earthquake-shelf). Courtesy of Mark Selby.

However, some objects are lost, stolen, or mislaid forever and are irreplaceable because of the memories associated with them. As an artifact's data are likely to remain in the context of the Internet of Things, *Tales of a Changing Nation* explores how the unique materiality of a connected object can serve as a vessel also for those memories that have lost their tangible counterpart.[9]

A provocative illustration of how data can 'materially' change an object and thus alter memory along with those changes is *The Earthquake Shelf* (Selby and Kirk, 2015).[10] The project uses real data and eyewitness accounts to fabricate mementos of earthquakes (Figure 4.4). It also uses scientific data such as magnitude, duration, and location, along with more personal descriptive accounts of events, to alter the material characteristics of existing objects. This work in progress is an investigation into how data could be used to shape the material qualities of otherwise 'insignificant' artifacts so that they are better able to reflect our personal experiences and tell stories about our past.[11]

Of Kitchen Tables and Acoustic Guitars: Reviving the Social Life of Objects

Arjun Appadurai (1986) and Igor Kopytoff (1986) usefully introduced the idea of things having social lives and thus life histories. Taking issue with the Marxian focus on production and looking instead to the

commodity's total trajectory, from production to exchange, consumption, and disposal, they laid the ground for thinking about objects as having histories, biographies, and memories. With the Internet of Things, it becomes possible to 'read', trace, and retrieve these life-stories and memories of objects. Similarly to *Tales of Things*, the next set of projects we discuss makes use of machine-readable codes to associate online media content with material artifacts. However, because in these projects material changes are not reversible, the connected object here begins to 'bear witness'. More than active reminders for human story-telling, these objects have the ability to remember where they have been and with whom, and so to recollect, indeed re-call, their own memories. Such memories are not attached to the material artifact a posteriori; they are inherently part of the becoming of the connected object. As if it were 'incorporated' in the material embodiment of the object, data grow and decay with the object and with that, the patina of memories the object has accrued throughout its life. Here the perspective no longer is that of the human, attaching personal memories to the material artifact a posteriori; it is the perspective of the object 'bearing witness' to its own becoming, its mattering.

Chiocciola (Robbins, Giaccardi, Karana, and D'Olivo, 2015) is a 'personal memory tracer' designed by Mirsaeid Mousavi at Delft University of Technology as part of research conducted within the Connected Everyday Lab. *Chiocciola* (in Italian, 'snail') enables people to intentionally create and leave a trail of material traces onto ordinary objects as a way to inscribe, grow, and relive memories (Figure 4.5). Cherished family moments around the kitchen table, or the laughter
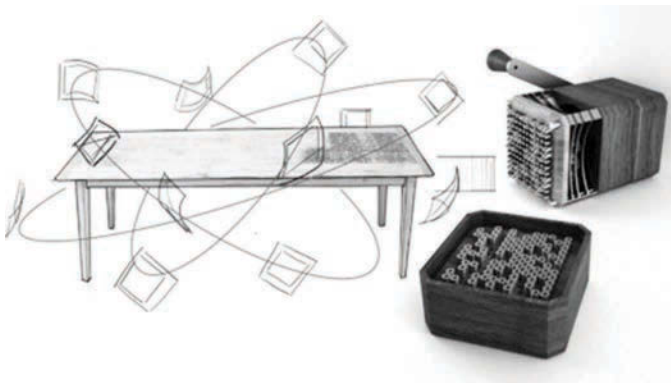

Figure 4.5 *Chiocciola* (in Italian, 'snail') enables people to intentionally create and leave a trail of material traces onto ordinary objects as a way to inscribe, grow, and relive memories. Courtesy of Mirsaeid Mousavi.

that was caught during the first time the table was used at a dinner party, can be added to the object itself and become digitally accessible via a physical trace made on the material surface of the table. Slowly and carefully engraving the trace into a natural wooden surface allows this surface to 'mature' and develop a deliberate 'patina' subject to both intentional and unintentional memory practices, and possibly degrading environmental factors.

Similarly, *Carolan Guitar* (Benford, Hazzard, and Xu, 2015; Figure 4.6) is a guitar that tells its own story, from the sourcing of the tonewoods used to construct it through the processes of construction to the history of its ownership to the tunes that it has played. The finished instrument was named Carolan after the Celtic composer Turlough O'Carolan, the last of the great blind Irish harpists and an itinerant musician who roamed Ireland at the turn of the eighteenth century. Acoustic guitars are highly traditional and often valuable, especially when made by hand through the crafting of expensive and delicate tonewoods by a highly skilled luthier. Guitars also tend to be long-lived, existing for decades, sometimes even centuries, and consequently being passed down among owners and quite often outliving them. The project uses unique technology to hide digital codes within the Celtic-inspired decorative patterns adorning the instrument. This unusual technology enables the guitar to build and share a 'digital footprint' throughout its lifetime. Just as 'memory tracing' with *Chiocciola* requires time and physical effort on the material surface, so applying interactive surface decoration onto the *Carolan Guitar* requires that one becomes intimately familiar with the material properties arising from the quality and nature of wood and with

Figure 4.6 *Carolan Guitar* is a guitar that tells its own story. The project uses unique technology to hide digital codes within the Celtic-inspired decorative patterns adorning the instrument. Courtesy of Steve Benford.

the techniques for etching, cutting, and inlaying the decoration. The perspective of the object is inscribed and brought to life only through a slow and meticulous material engagement that rejects the embedding of sensors, actuators, and displays that are typical of connected objects. By facilitating a way for traces to be made deliberately upon the object by those interacting with it, both projects attempt to speculatively explore new memory rituals. These new rituals traverse and celebrate the personal, collective, and material memories, which come to converge and blur within ordinary contexts.

Of Gestures and Algorithms: Reminiscing Together 'with' the Object

According to Jan Assmann, 'Things do not "have" a memory of their own, but they may remind us, may trigger our memory, because they carry memories which we have invested into them, things such as dishes, feasts, rites, images, stories and other texts, landscapes and other "lieux de mémoire"' (2008, p. 111). But if we grant objects agency, may we not also say that things have a memory of their own? This final set of examples illustrates the case of clocks, radios, and printers that begin to participate in shared practices of remembering by exhibiting an autonomous ability to recollect. These objects do not move, do not accrue stories, do not witness, but they have access to our storage of memories and, with that, the power to affect them. They help us to enter into a conversation with the familiar voices and images that define the sense of who we are and where we come from. *Geist* (in German, 'spirit') lets the ghost of the land of origin seep through in the day-to-day use of radios, clocks, and calendars, to help expat families negotiate their sense of identity through small, everyday gestures around those objects. Capable of autonomous reasoning instead, the *Photobox* and *me.mento* printers recollect on their own terms, within different temporalities and with distinct algorithmic preferences, and provoke their owners to serendipitous encounters and reframings.

   Geist (2015) is a family of connected objects for people living outside their native country, developed by the Connected Everyday Lab at Delft University of Technology in collaboration with the design consultancy The Incredible Machine. *Geist* consists of a radio, a clock, and a calendar. Unapparent to outsiders, these objects provide a subtle link to a home far away and help expat families develop a sense of connectedness and belonging. By adjusting the knob of the radio, a family can navigate a bespoke spectrum of radio channels that ranges from their native country to the place where they currently reside or any other place a family may feel a social and cultural connection. The radio acts as a transponder, setting coordinates as a point of reference for the other *Geist* objects. If a family adjusts the knob on a frequency of their hometown,

Figure 4.7 Turning the dial of the *Geist* (in German, 'spirit') radio enables expat families to transverse the space in between 'homes' and bridges the chasm that defines the social and cultural experience of being an expat. Courtesy of Connected Everyday Lab and The Incredible Machine.

for example, the radio will transmit local radio streams, the clock will set on a different time zone and glow in the colors of the sky back home, and the calendar will print out the date with local headlines. The mundane performance of turning the dial to transverse the space in between 'homes' physically manifests and bridges the chasm that defines the social and cultural experience of being an expat. It is through these small, everyday performances that the connected object helps expats reconcile and negotiate their sense of belonging and identity.

me.mento (2015) is another concept developed by Felix Marschner at the Connected Everyday Lab at Delft University of Technology. *me.mento* is a small photo printer that rummages in old photos to print a small memento for its owners' photo wall. By doing so, *me.mento* transforms the traditional picture wall in a space for unexpected memories and reflection (Figure 4.8). *me.mento* prints out pictures that are discarded, not shared publicly, or somehow forgotten in one's photo stream—perhaps those pictures that turned out blurred or otherwise imperfect, like the one secretly taken with the smartphone by your child in a moment of distraction and that we often leave behind. Choosing according
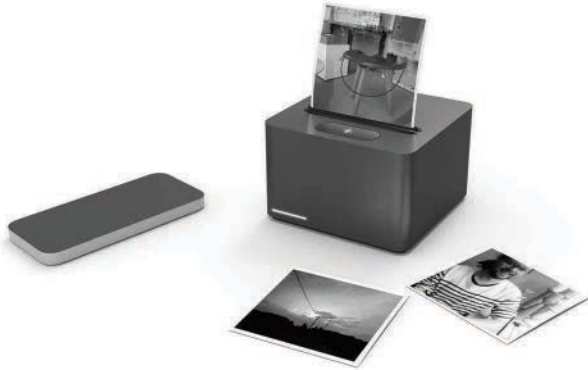
Figure 4.8 me.mento rummages in its owners' photo stream and prints out pictures that are discarded, not shared publicly, or somehow forgotten. Courtesy of Felix Marschner.

to its likings, *me.mento* has, as it were, feelings of its own. It is sentimental. People like snapping pictures with their smartphone of everything they feel is special. While the pictures of great events are curated and shared, pictures of small moments often get cluttered and probably forgotten at some point. *me.mento* recognizes faces and chooses those of friends and family the most, while avoiding those that are already publicly shared on social networks. In its algorithmic processing, *me.mento* searches for balance and will use a picture's metadata to print out a picture of a forgotten moment, thus inviting the re-collection of, for instance, the last evening together with one's friends after a busy week without photo updates. Prompting involuntary autobiographical memories, *me.mento* becomes a technology of memory that is also a technology of the self, shaping and affecting our sense of identity (Foucault, 1988; Plate and Smelik, 2009).

Similarly, *Photobox* (Odom et al., 2014) is a domestic technology that prints four or five randomly selected photos from the owner's Flickr collection at random intervals each month inside of a wooden chest (Figures 4.9 and 4.10). *Photobox* is slow. Its reasoning contests accelerated rates of photo accumulation to facilitate reflection and help find meaning. The behavior *Photobox* enacts is to search its owner's Flickr collection, randomly select a single image, and then print this image within the box where it will wait to be discovered. By exhibiting an autonomous ability to recollect, clocks, radios, and printers provoke us to remember. Actively selecting what is to be remembered and what is to be forgotten, they become not just instrumental to human memory but integral to it.[12]

Figures 4.9 and 4.10 Photobox is a domestic technology that prints four or five randomly selected photos from the owner's Flickr collection at random intervals each month inside of a wooden chest. Courtesy of Mark Selby.

Remembering Beyond Anthropocentrism

In the near future, designing technologies of memory will require the exploration of new gatherings between people and 'things', new ways for people to connect and interact with things and things with people—and with other things. Because 'things' are socio-material frames that modify how memory practices are performed and more broadly influence the politics of remembering, the design of future technologies of memories will require sensitivity to how people, objects, and values can mutually come to constitute each other, in the options offered and not offered by the proposed technology.

According to Karen Barad,

> It may seem perverse, unimportant, or meaningless, to attribute memory to an inanimate happening, but that speaks of a failure of imagination that gets stuck at the threshold of one of the most stubborn of all dualisms—the animate/inanimate dualism—that stops animacy cold in its tracks, leaving rocks, molecules, particles, and other inorganic entities on the other side of death, of the side of those who are denied even the ability to die, despite the fact that particles have finite lifetimes.
>
> (Barad et al., 2012, p. 21)

In this chapter, we have explored the relationship between materiality and memory, focusing on the ways in which 'things' change our ability to read the past and write the future and how they open up spaces of remembrance that are beyond what we deem personally or socially significant and worthwhile to be remembered (for instance, grandma's rolling pin in *Tales of Things* or the blurred image recollected by *me.mento*). Within unique configurations of materials, data, and connections, connected objects 'do' and 'say' things to us that can help us reminisce (*Geist*, *me.mento*, *Photobox*), contest (*Tales of Things*), and even forget, eventually (*Chiocciola*, *Carolan Guitar*).

If social media allow long and meaningful connections to be established, technologies such as the Internet of Things allow using these connections to add to the materiality of the object, perhaps even reveal narratives that have been obscured by the apparent physicality of the artifact. As such, the Internet of Things works to counter the commodity's loss of the capacity to remind people (and other things) of where an object has been, its history and travels. Restoring this capacity to objects instead, the Internet of Things restores an ethical dimension to our relationship to things in that they become not only things worth remembering; but also things with a memory of their own and with which to negotiate spaces of remembrance. As the

Internet of Things gives objects the ability to co-perform next to people (Kuijer and Giaccardi, 2015), it also offers alternative associations and histories, contesting the veracity of any memory that is presented to us, reminiscing, and interfering with what people remember and how they remember it. If we then acknowledge the difference between artifacts as carriers of human added content and artifacts collecting data through their own means (that is, sensors, connections, and algorithms enabled by their designers), we ought to ask: to what purpose will things 'remember'? And for whom will they recollect? This relationship is something that we will increasingly have to negotiate as information and communication technologies enable objects that are part of our lives to begin to articulate spaces of remembrance and significance beyond what humans can remember: remembering different things, and doing so in different ways, both in how they recall and how they recollect and communicate these memories. As objects are given the ability to connect and participate in practices of remembering on their own terms, they will increasingly challenge our anthropocentric understanding of what is 'possible' and 'worthwhile' to remember.

Notes

1 'Doing' and 'saying' are expressions borrowed from Schatzki (2002).
2 http://www.kulturarv.dk/1001fortaellinger/en_GB.
3 See http://movingpeople.nu; http://www.power-of-art.nl/campaigns/moving-people-2/; https://www.facebook.com/powerofarthouse.
4 In computer scientist Michael Rubinstein's Ted Talk 'See Invisible Motion, Hear Silent Sounds' demonstrating the 'motion microscope', a video-processing tool that plays up tiny changes in motion and color impossible to see with the naked eye, things such as a bag of chips and a plant are shown to 'hear' music and conversations. As they are recorded on film and amplified, the tiny motions that sound waves create in them show things to be recording devices with memories of their own. See Rubinstein (2014).
5 http://www.cisco.com/web/solutions/trends/iot/portfolio.html.
6 http://talesofthings.com.
7 See, for example, the tale about grandma's rolling pin: https://www.youtube.com/watch?v=roMmntxj7FM.
8 See, for example, the memories of the Scottish dancing hall culture accrued around the 'ghostly' dancing shoe of Figure 4.3.
9 Similarly, *Story Shell* (Moncur, Julius, van den Hoven, and Kirk, 2015) is a bespoke connected object for a bereaved parent, serving as a vessel for memories of the lost child.
10 http://markmakedo.co.uk/portfolio/earthquake-shelf.
11 Similarly, the *broken probes* explored by Ikemiya and Rosner (2013) are meaningless artifacts transformed through processes of intentional degradation into unique identifiers with which to associate and retrieve digitally recorded histories.
12 On forgetting, see Plate (2016).

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