

# Forgetting as a feature, not a bug: the duality of memory and implications for ubiquitous computing

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From earliest times, humans have developed strategies for increasing their ability to remember and commemorate significant events in the history of their communities. Epics have been created, memorized, and passed on through generations even before the development of written records. Monuments have also been built to commemorate important events. Stratagems for helping people to retain information, mnemonics, have allowed us to develop what has been termed *memoria technica*—‘artificial’ memories. In this essay, while recognizing that new technologies support people and organizations in their remembering processes, I wish to stress that other complementary human activity that constitutes the duality of memory, namely *forgetting*. This is a topic that has been relatively neglected or treated in a cursory fashion in much academic discourse to date. I note some examples of the scattered but intriguing work on the subject, from very different disciplinary perspectives, before turning attention to the potential relevance of judicious forgetting in the context of new technologies and visions of the future. Examining the role of forgetting opens up some interesting possibilities. We should re-frame our discourse and expand the *design space* concerning ubiquitous computational technologies in our everyday life to incorporate aspects of this forgetting dimension.

*Keywords:* Duality of memory; constructive memory; forgetting; collective forgetting; amnesty; design space; ephemeral technologies

*we do need some form of anticipatory design or invention of the future—an open laboratory for new ways of living together . . . As desirable future possibilities are uncovered and their connections with the present traced out, we learn what might be done now, or at the very least, what must be done to prevent desirable opportunities from being excluded in the future.*

Kevin Lynch (1972)

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## 1. Preamble—the difficulties of prediction

Examining the ways in which new technologies might augment human and social—and even political—activities in the future is a necessary, yet risky endeavour. Necessary in that, as pointed out in the opening quote by Kevin Lynch, doing so can help us to ensure that we do not close off potentially interesting avenues for exploration; risky, in that there is often a tendency to dwell on technological possibilities, and underestimate, or not appreciate, the ways in which individuals, communities, and whole societies shape these technologies to their own ends. More generally, attempting to predict what the second- or third-order effects of particular technologies might be a decade or two into the future is a notoriously difficult exercise. Witness the unpredicted explosion in North American suburban living between the Wars as a result of the widespread ownership of cars. Negotiating between the Scylla of technological determinism and the Charybdis of social determinism in portraying possible futures is a tricky business. What I aim to do in this article is not so much to attempt to predict the future, but rather to argue that the premises for our predictions need examination to ensure that they themselves are not unnecessarily limiting. Specifically, I explore the role of forgetting in human activity, and how our discussion of augmentation technologies has tended to ignore this dimension to date. This has led to a narrowing of design options for ubiquitous technologies. Opening up the design space to include consideration of judicious forgetting activities may lead to novel concepts and prototypes.

## 2. Introduction

I believe that much of the current thinking about the future suffers from a certain myopia, not so much in terms of the technological possibilities *per se*, but rather in terms of the description of the human, social and cultural worlds described therein. This is apparent when one examines the nature of the new worlds that are presented by many futurist commentators for us to contemplate, which are remarkably lacking in nuanced presentations of everyday social living situations and social practices. In my view, recent debates about how technical developments such as ubiquitous computing and what has come to be termed ‘ambient intelligence’<sup>1</sup> might affect our lives—or, perhaps more correctly, might be appropriated or adopted into our lives—portray a decidedly undifferentiated perspective on the nature of everyday life. Scenarios of life in the ‘intelligent home’, or of ‘nomadic working’ or ‘mobile learning’ often appear banal from the point of view of lived experience. However, rather than engage in a general critique of what has been termed this ‘rhetoric of the electronic sublime’, I will engage with just one particular aspect of human and social life—memory—and show how surprisingly limiting many of our technology-inspired scenarios of the future are. The issue here is not simply to critique the Brave New World offered by the pundits, but rather to show how, in neglecting the duality of memory, in terms of the dual activities of *remembering* and *forgetting*, we are unnecessarily limiting our options, in terms of the shape of the design space that is open before us concerning the ways in which technology might play useful roles in our future human and social world.

The paper is structured as follows. Firstly, I argue that the dominant perspective in the human sciences over the past quarter-century has been one that views the human mind as

<sup>1</sup>Indeed, the concept of ‘ambient intelligence’ itself warrants just as much de-construction for its rhetorical significance as the term “artificial intelligence” received in an earlier period.

an information-processing device, similar to computing machines. This computer model of mind has blinded us to a number of crucial features of human thinking, most importantly, the active and embodied nature of human thinking and acting in the world. In the context of our discussions on memory, I argue that this approach has over-emphasized a passive rather than an active model of human memory, ignoring the fact that remembering and forgetting are active processes. I then argue for the importance of forgetting in many aspects of human life, from a personal, collective and institutional perspective. Next, I shift my attention to new technologies and discuss how these technologies are currently being viewed as either substitutes for, or possible augmentations of, human faculties. I argue that the proffered scenarios of computerized 'help' for human activities evident in the ubiquitous computing world tends to focus on augmentation of human remembering, with sensors and computer networks archiving vast amounts of data, but neglects to consider what augmentation might mean when it comes to that other human activity, namely, forgetting. In the final section, I offer a few thoughts and point to some conceptual design experiments relating to possible forgetting support technologies. The purpose of the paper is to encourage people to explore a wider range of design options concerning technology augmentation. We need to examine how new technologies might support a range of human and social activities, including a deeper reflection on the benefits of human, social and institutional forgetting practices. But let us begin with a brief outline of the currently pervasive, and in my opinion, seriously misleading view that the human mind is similar in many ways to that of a computer.

### **3. Problems with the computer model of memory**

Historically, our understanding of mind has always been influenced by successive technological developments, with the mind being viewed as a giant telegraph system in the late 19th century, just as more recent psychological conceptions of human memory as a storage device have taken computational mechanisms not simply as metaphor, but as reality. This approach has tended to reify human memory, focusing on memory as a thing, rather than on remembering as a human activity. While this notion of mind as a computational mechanism is central to the field of cognitive science, and has led to interesting explorations, it also has its drawbacks. This is especially so in the field of memory, where a too-literal interpretation of human memory as being akin to computer memory has resulted in the neglect of many central features of human remembering activity in the world. Our models of memory are replete with technical terms such as 'erasure', 'content addressing', 'retrieval', which equate human and computer memory. Yet it has been common knowledge within the human sciences for decades that human memory is not akin to the storage model of computer memory. One of the outstanding psychologists of the first half of the 20th century, Sir Fredrick Bartlett, has put it succinctly: 'Remembering is not the re-excitation of innumerable fixed, lifeless and fragmentary traces. It is an imaginative reconstruction, or construction, built out of the relation of our attitude towards a whole active mass of organized past reactions or experience, and to a little outstanding detail which commonly appears in image or in language form. It is thus hardly ever really exact, even in the most rudimentary form of rote recapitulation, and it is not at all important that it should be so.' Thus remembering is a constructive act: 'remembering appears to be far more decisively an affair of construction than one of mere reproduction. . . . condensation, elaboration and invention are common features of ordinary remembering' (Bartlett 1932, p. 205).

Despite Bartlett's pioneering work, during the 1960s and 1970s the information-processing perspective in cognitive psychology was so dominant that its metaphors became part of the everyday understanding of human life. It was only in the late 1970s that there was a renewed interest in other perspectives on the mind, when aspects of the computer model were called into question. More emphasis began to be given to ecological factors in human cognition, which did not accord well with simple computational accounts of phenomena, and new conceptual foundations were developed (e.g. Winograd and Flores 1986). It is important to remember that the information processing approach is—even in the domain of cognition—but one among the many traditions in psychology. Some of the other traditions, for example phenomenology, and cultural–historical activity theory, have a distinctively different view on cognition and memory. One such psychological tradition that also shares Bartlett's concerns with the active nature of human memory processes, emphasizing remembering as purposeful action in some definite context, is Soviet cultural–historical psychology, founded by L.S. Vygotsky in the 1920s, and elaborated by A. Leontjev and others subsequently. Cultural historical psychologists see remembering as processes of structuring and storing past experience to make possible its use in activities. It is a purposeful action relying on the use of socially developed signs and depending on the goals and motives of the activity within which it takes place. Each action of memorizing or storing information and each action of recalling and remembering take place in the context of an activity. If storing context and recalling context are the same activity, the interpretation of the material may not be problematic. But if remembering takes place in a different activity where material has been stored, the material will be reinterpreted with respect to the new object of activity, and there is no automatic guarantee that the material is relevant anymore in the same way than it was in the context of storing it.

As we explore these active and constructive views on memory, we also need to consider its active complement, namely forgetting. Forgetting is a central feature of our lives, yet it is a topic which has had relatively little serious investigation in the human and social sciences.<sup>2</sup> Referring to the computational view, forgetting can be viewed as the simple erasure of a specific memory, or the loss of the link to a memory location (an encoding or decoding problem). In general, forgetting is seen as one more example of the fragility of the human mind, where it loses out to computers, with their ability to retain information indefinitely. Forgetting is thus seen as a bug in the human makeup, an aspect of the human memory system that has negative connotations. In this paper, I wish to question this assumption, and argue firstly that judicious forgetting is of fundamental value, both for individuals and societies, and then raise some issues for the development of new interactive technologies in the context of thus viewing forgetting as a feature, and not a bug. While this essay is schematic and dances over many difficult issues, the benefits of such a thought exercise are that it might open up some interesting technology design issues for the future.

#### 4. An exploration of forgetting

Cheerfulness, the good conscience, the joyful deed, confidence in the future—all of them depend...on one's being just as able to forget at the right time as to remember.

Friedrich Nietzsche, 1873.

<sup>2</sup>Although there has been a recent surge of interest in the topic—see the Postscript.

Not for nothing did the ancient Greeks locate the springs of Lethe (Forgetfulness) and of Mnemosyne (Memory) nearby, and make those who came to consult the oracle at Trophonios drink the waters of first one and then the other.

Adrian Forty (1999)

#### 4.1 *Individual forgetting*

The importance of forgetting—whether by the individual, group, organization or even nation—has been observed and commented on by scientists, historians, politicians, philosophers, writers and poets through the ages. Focusing firstly on forgetting as a personal activity, the fact that we forget most of what impinges on us passes unnoticed in our everyday life. It is only when the normal process of forgetting is disturbed that we perceive its ubiquity. The writer Borges, in his famous short story, *Funes, the Memorious*,<sup>3</sup> tells of an Uruguayan man who is haunted by his inability to forget anything, and the story depicts how his life is made a misery as a result. The great Russian psychologist, Alexander Luria, has provided a moving portrait of a mnemonist, Sherashevsky, in his gem of a book—*The Mind of a Mnemonist* (Luria 1968). Luria notes Sherashevsky ‘converted each impression, even acoustically perceived words, into optical images, which were closely associated with other sensations, including sounds, taste, and tactile sensations.’ But while this ability allowed him to perform prodigious feats of memory, it also made him unable to forget, and his ability to think clearly was constantly being disrupted by the forcefulness of these image memories. Luria notes: ‘Many of us are anxious to find ways to improve our memories; none of us have to deal with the problem of how to forget. In Sherashevsky’ case, however, precisely the reverse was true. The big question for him, and the most troublesome, was how he could learn to forget.’ The neurologist Oliver Sacks provides an elegant account of the activities of remembering and forgetting in his book *An Anthropologist on Mars* (1995). He discusses the interesting case of Franco Magnani, the painter who appears to have a frozen set of images of his home town of Pontito in Tuscany, and is unable to create new works, but keeps returning to stylized images of his village in his paintings.

These cases seem to show how disturbances of the normal forgetting process can create difficulties for people in accomplishing their everyday activities. Forgetting is not some unfortunate limitation of the human, but is rather a necessary mental activity that helps us to filter the incoming sensory flood, and thus allows us to act in the world. As noted in the *Oxford Companion to the Mind*: ‘We think of forgetting as undesirable. However, the difficulty of remembering similar events suggests that there is a positive advantage in forgetting . . . the great majority of our moment-to-moment experiences . . .’ (Gregory 1987).

The German philosopher Friedrich Nietzsche, in his essay *On the use and abuse of history for life* (1873) has a number of pertinent observations about the need for people to forget, in order to live. While his remarks are more directed at a critique of the then-dominant German historicist line of thinking, he notes: ‘Forgetting belongs to all action, just as both light and darkness belong in the life of all organic things.’ Other writers have pointed to the linkages between forgetting and the experience of wonder. Michael Pollan, in a volume entitled *The Botany of Desire*, notes that: ‘Memory is the enemy of wonder,

<sup>3</sup>A recent English translation of Borges *Collected Stories* (Hurley 1998) has, unfortunately, changed the title to *Funes, His Memory*, which I feel reduces the connotation of active remembering that I am pursuing here.

which abides nowhere else but in the present. That is why, unless you are a child, wonder depends on forgetting'<sup>4</sup> (Pollan 2001).

## 5. Collective remembering and forgetting

Forgetting is not a natural, but a cultural process; a developed civilization develops not only techniques to remember, but also to forget, to give a chance to new generations, to open new ways of living and thinking.

Ivalyo Ditchev (1998)

In recent years the issue of collective memory has become a topic of considerable interest, both for researchers in the social sciences and for historians and political scientists. Much of this work builds on the pioneering work of the French sociologist Maurice Halbwachs (1992). This issue of collective memory has been examined in the context of developing cultural identity, and fostering national solidarity. The question of what is treasured, actively remembered and passed on to the next generation versus what is ignored and forgotten is often explored by historians and can surface serious political issues. As the French writer Ernest Renan put it: 'The essence of a nation is that all the individuals have a lot in common, and also that they have all *forgotten a lot of things*' (Ernest Renan, as quoted in Benedict Anderson (1983), p. 6). Examining the topic of forgetting in this light, one could ask: Can there be a collective forgetting? The historian Yosef Yerushalmi in his book *Zakhor*, on Jewish history and memory, ponders this concept: 'Collective forgetting is at least as problematic a notion as collective memory. If we take it in a psychological sense, it becomes virtually meaningless. Strictly speaking, peoples, groups, can only forget the present, not the past... What we call forgetting in a collective sense occurs when human groups fail—whether purposely or passively, out of rebellion, indifference, or indolence, or as the result of some disruptive historical catastrophe—to transmit what they know out of the past to their posterity. (Yerushalmi 1996.)

The political dimensions of collective memory and forgetting are also ever-present in historical conflicts. As Papadakis (1993) notes in his work on the differing memories and forgotten episodes of historical events by Greek and Turkish Cypriots: 'Memory and forgetting can be based on experience but they can also be used strategically to give rise to different interpretations or stories of the past. Organized remembering and deliberate forgetting are ways in which groups attempt to structure their world'. Witness the Serbian identification with idealized historical events in Kosovo, or Northern Irish Protestants with the Battle of the Boyne, or the Soviet government's meticulous erasure of events and people from documents, monuments, photographs, etc. As Ditchev (1998) notes, the act of forgetting is not neutral. From a political and historical perspective, forgetting can be seen as both a blessing and a curse. A blessing in that, to move forward, one needs on occasion to forget, bury the past and forge a new beginning. A curse, in that 'those who forget the past are condemned to repeat it', as the saying goes. How does one recognize the legitimate wish of a people to remember its past and yet not to be swamped and enveloped by it? These issues have occupied the minds of many legal and other scholars in the past century. Within the justice system, we see the development of practices which require certain kinds of deliberate forgetting after a period, in order to allow people to have a new start in life, and not be haunted by an indiscretion many years earlier. At the political level, the concept of amnesty performs the same function, where events are not

<sup>4</sup>Pollan provides an amusing and informative account of the effects of marijuana on human memory.

hidden, but a line is drawn under them, and the society attempts to move forward. Blanchette and Johnson (2002) examine some of the institutional issues surrounding forgiving and forgetting, through examination of the rules for bankruptcy, erasure of juvenile criminal records, and fair credit history reporting regulations. They are concerned about the ways in which new technologies can affect aspects of social forgetting: ‘While critics of the panoptic society have justly remarked on the *ubiquitousness* of data collection practices, we underline how such practices invisibly extend the *persistence* of social memory and diminish social forgetfulness’. Acts such as that in South Africa recently, with the conduct of the Truth and Reconciliation commission, are innovative attempts to both respect the events in the past yet to move forward without seeking revenge—forgiveness is another matter. The ethics of this move from justice to amnesty is of course open to debate, but at least it provides us with an exemplar of how we might institutionalize a forgetting process that is still mindful of earlier actions, without recourse to acts of revenge to redeem past wrongs.

Thus judicious forgetting, at a human and societal level, is as an activity worthy of study and indeed, support, through our new forms of technology. Let us return now to the examination of the relation between human and computer activities. What is of interest is how taking the dual processes of remembering and forgetting activity seriously might impact on our designs of novel technologies for augmenting human abilities.

## 6. Similarities and differences between humans and computers

The great virtue of human memory is its power to forget.

Julian Hilton (1991)

The study of human–computer interaction is largely founded on a view that compares the capability of humans and machines. An early contribution to this view was *Fitts List*, formulated by the human factors researcher Paul Fitts in the United States in 1951. Fitts produced a table, showing on one side a list of tasks that *men (sic) are better at* and on the other, tasks that *machines are better at*. Comparing humans and machines in this way provides a means of making decisions about the tasks that people will undertake and the tasks that will be done by machines—what used to be termed ‘allocation of functions between man (*sic*) and machine’. In these kinds of exercises, humans are noted to have poor memory, whereas machines are claimed to have ‘perfect’ memory. Thus, it is argued, one way computers can augment human capabilities is by ‘supporting’ our weak memory capabilities. But if, as we have been arguing here, forgetting is not simply a bug in the design of the human, but a necessary human activity, then how can we shift our thinking about the complementary role of people and computers in human–machine systems? What, for instance, might it mean to try to use technology to ‘augment’ forgetting? Or perhaps we could reverse this point, and say how could humans teach the computer to ‘forget’? Of course, at one level, hitting the ‘erase’ button does cause the computer to forget, but are there other perspectives to bring to bear on this point? Julian Hilton takes up this very point: ‘[But where] human memory in all its aspects is defective, forgetful, liable to age and tending to fictionalize, computer memory is accurate to the point of literal-mindedness and reliable to the point of irritation. This fundamental difference needs to be explored since it may be a false presupposition of cognitive support systems that the computer’s capacity to support inadequate human memory is necessarily a positive benefit.’ Taking this stance, one then can query the accepted wisdom of the relation between the human and the machine in the context of memory. Forgetting would

now be seen as a feature of human capabilities, and not simply a bug to be fixed by computer augmentation. Conversely, the inability of computers to forget can at times be viewed as a bug, and not a feature. Hilton forcefully argues: ‘The real de-skilling of human memory that may be effected by the computer is the fear it generates in us of forgetting, . . . Will computers impair our capacity to forget, especially to forget in a judicious manner?’ It is this question that serves as the *leitmotif* of this essay. In an age of ubiquitous computing and scenarios of ambient intelligence, this issue of judicious forgetting deserves further scrutiny.

## 7. Remembering and forgetting in the age of ubiquitous computing

If it is characteristic of human memory to be defective—to fictionalize, to fantasize, to be forgetful—is it always such a help that the computer is not like this at all?

Julian Hilton (1991)

Much recent discussion around ubiquitous computing and ambient intelligence centres around the ability of these technologies to enhance our ability to record, archive and retrieve objects, conversations, behaviours, situations and events in the world. On a political level, the surveillance society is a reality, from the level of cctv cameras in workplaces and public spaces to the personal (ab)use of cameras in mobile phones to record and distribute private human activities. The major feature of these systems is the augmentation of our ability to record and playback events that happen in the world. This ability is a mixed blessing. Apart from the use of augmented devices to intrude into our private lives more and more, breaking down continually what is accepted as ‘private’ (witness such TV genres as Reality TV, voyeuristic shows such as *Big Brother*), there has been very little consideration of the use of technologies to help us forget, either at an individual level, or at a group or society level. Just as one has had research examining the ways in which personal memory might be enhanced by technology (e.g. Lamming and Newman 1992), one could ask what would a research programme to support personal or collective forgetting consist of? Perhaps we should re-consider this fetishization of recording for recording’s sake, along with the use of novel sensor networks to collect and collate huge quantities of information about people’s activities. The use of these data raises many issues concerning personal privacy. On a larger scale, it raises questions of a surveillance society (Lyon 2001). This is especially the case in the light of recent political events, and the launch of government research programmes in the United States exploring concepts such as ‘Total Information Awareness’. What is the purpose of these exhaustive recordings of personal activities and events? The only rationale seems to be, *since it can be done, then it should be done!* But in rushing to develop ‘total recall’ systems, we are in danger of forgetting that the human ability to forget is of huge consequence for the personal, social, organizational, and even political lives of citizens. So, what might the future be like if this approach to *forgetting as a feature* was taken seriously?

## 8. Taking forgetting seriously in design

Who has not experienced the liberating feeling of throwing off the baggage of the past and beginning afresh to confront the world? In a sense acts of pardon, amnesty, Catholic absolution in confession, are all mechanisms by which people can bury the past and begin anew. Computers, however, can be a source of frustration due to the amount of information that they provide and hold. We are all suffering from ‘information

overload’—too many email messages in our Inbox, and too much history. These are inducing a state of paralysis, affecting people’s ability to act, as Nietzsche noted. Looking to the future, is the only possible trajectory for technology development one that extends a network of surveillance and control mechanisms ever deeper into our personal and social spaces—recording and archiving more and more of our personal and collective activities?

The underlying premise for much of the research on more sensitive and powerful data collection, storage and retrieval mechanisms in areas such as ubiquitous computing is flawed. ‘More’ data do not imply better quality decisions. What managers often require is less information and better interpretation. This topic has been discussed by many researchers (Feldman and March 1981). Our computer archives can become the source of organizational paralysis, stifling innovation and creativity by channelling people’s efforts into examining only the accumulated material of the past, rather than spending time on exploring possible futures. Likewise, the accumulation of huge amounts of personal data on the lives of people through ‘ambient intelligence’ environments has the potential to stifle and control people’s lives, rather than act as a liberatory force.

Many of the visions of ambient intelligence currently in vogue are predicated on a technologically enhanced physical environment—workplace, neighbourhood, even family home. This is often coupled with a technologically enhanced human body—where body sensors are inscribed in our physical body. Wearable and ambient technologies are linked by a set of networks that input, process and output data to and from a variety of software applications. These computationally enhanced artefacts and sensor networks are assumed to provide near continuous recordings of our location, activity, and physiological, even psychological, state, to a computational network. This information can be usefully monitored by a variety of applications, and can be passed on to other systems, and even other people. These applications can in turn use these networks to selectively provide information back to the person, informing them of the state of play of various people and ongoing events. Thus, a health monitoring application might note increased blood pressure as one drives on the motorway, and might suggest that one listen to some music, or take a rest break. These kinds of scenarios portray the technology as a benign parent that looks over, and after, our welfare. Whether the scenario relies on some intelligent agent to monitor and respond, or whether the system is simply acting as a relay or conduit to another human monitor is not the main point here, although many of the ‘ambient intelligence’ scenarios assume the former. Rather, what I wish to focus on is the assumption that people will, both as individuals, as groups and communities, and as members of a civic society, sanction this level of surveillance and monitoring of their activities and even their personal physiological states by autonomous agents or applications over which they may not exert complete control. This vision is disquieting for many. The tendency to use the power of the computer to store and archive everything can lead to a stultification in thinking, where one is afraid to act due to the weight of the past. People may be concerned about their future being affected by something said or done decades earlier in their lives. This is already a problem experienced by people in politics, who when seeking high office, find aspects of their past being used to criticise them.

What is necessary is to radically re-think the relation between artefacts and our social world. The aim is to shift attention to a portion of the design space in human – computer interaction and ubiquitous computing research that has not been much explored—a space that is supportive of human well-being. Let us explore some scenarios where the technology might be used to assist in forms of forgetting, rather than remembering.

Perhaps we can think of ephemeral technologies,<sup>5</sup> or perhaps more correctly, technologies that support ephemeral events, in distinction to the persistent technologies that are usually envisaged. The ideas presented are very simple and playful, a starter-pack to begin to explore an alternative design space incorporating aspects of forgetting.

In many old espionage movies, an agent is often given a message on a tape, which then self-destructs to hide the evidence. This is a simple case of an ephemeral forgetting technology. Many people who use email are aware of situations where private emails are passed on inappropriately to others. While social conventions can evolve to contain this problem, perhaps a technical solution is possible. Private messages might be marked so that it is not possible to forward them without permission from the author. Perhaps all social messages may be designed to fade away over time. The concern here is that the variety of human interaction means, from informal remarks in a café or bar, to formal memos in an office, might paradoxically be reduced rather than enhanced through technological means—through the pervasiveness of wearable technologies that allow people to record and archive moments that heretofore were only available to participants immediately co-present. Already we are beginning to see this happening with the surreptitious recording of many personal telephone calls, the use of camera phones in private places, etc. As a reaction to this kind of pervasive surveillance society, some designers and researchers are exploring ways of taking back control over electronic spaces. One radical idea elaborates a notion of a ‘digital shelter’ where various forms of electronic signals are blocked within certain spaces or places, thus allowing people the freedom to chose to be electronically ‘on’ or ‘off’ (Sepulveda-Sandoval 2001). We could imagine the development of personal ‘sweeper’ technologies that would inform us if particular spaces were being bugged, and activities recorded. Similarly, we could imagine the design of electronic ‘jamming’ technologies that would hinder the pickup of meaningful signals from particular sites, akin to the current military jamming technologies. We could imagine various kinds of electronic tagging systems for messages or material that could time-stamp material and contain something like a ‘sell-by’ date, where the information would self-destruct after the elapsed time, or where the distribution of your original message could be tracked, although the latter idea raises further privacy issues.

My point here is not to provide simple technological fixes to what are ultimately societal practices. Rather, the aim is to highlight different design options. We need to explore augmentation means for all human activities, both remembering and forgetting. These explorations should encompass a wide range of activities and involve a variety of actors. A critical perspective on the ever-increasing computerization of daily life needs to be developed. The collection and storing of data about peoples’ activities must not be uncritically accepted. Perhaps there is a need to re-ignite respect for the moment—for *being-here-now*. The moment should not be lost through attempts to capture it by electronic means. People should not spend their lives behind the eyepiece of a camera, or behind a microphone. Many cultural events celebrate the fleeting moment. They are special precisely because the occasion is limited and not preserved.<sup>6</sup>

<sup>5</sup>Paradoxically, our reliance on electronic storage devices such as CDs to store data instead of using paper has reduced the lifespan of our archives, as CDs are not built to last more than 50 years, as against 500+ years for paper!

<sup>6</sup>The issue of what is actually being preserved when we do make some form of record of an event is also open to question, as usually it is the personal experience of *being there* that is valued, not simply the visual or aural signal captured by the machine.

## 9. Conclusion

The purpose of this essay has been fourfold: Firstly, to bring to the reader's attention the duality of human memory, in terms of the processes of remembering and forgetting; secondly, to argue for a constructive rather than a storage approach to memory; thirdly, to discuss what it might mean to take seriously the role of forgetting in personal, communal and institutional life; and fourthly, to open up the design space for thinking about how ubiquitous technologies and sensor networks might be re-configured in order to augment or support judicious forgetting.

Earlier technologies, such as the pen and writing paper, have had a significant impact on human society, not simply in amplifying human capabilities, but in fundamentally restructuring our activities and allowing for novel forms of activity (Goody 1977, Olson 1994). In recent times, the way in which the World Wide Web has domesticated the Internet and made Web-browsing an everyday activity for huge numbers of citizens in much of the developed world is a powerful, and again largely unforeseen, phenomenon. Likewise the phenomenal growth of SMS messaging on mobile phones, especially among young people, has impacted on their activities, and again, was unforeseen as the technology was being developed.

Thus we must be very cautious in attempting to extrapolate from the past into the future, as we attempt to envision the uses of the new kinds of technologies that are emerging. What we can say with certainty is that most of our specific prognostications will be wrong. But that should not stop us from exploring scenarios, questioning implicit threats in technological developments and unearthing potential concerns for civil society. My purpose here has not been to pursue larger questions of the benefits and risks of future societal forms, e.g. what has been termed 'the transparent society' (Brin 1999) or a surveillance society (Lyon 2001). Rather, I have simply argued against a simple technological determinism that argues for a single model of how new information and communication technologies could figure in our future lives. Through the lens of forgetting as a human activity, I have attempted to provide an alternative starting point from which we might explore technological 'augmentation'—studying people's everyday activities and practices. Where this might lead is dependent on the ingenuity and creativity of many people, partly designers, technologists, and ergonomists working in the development of new products and services, and partly ordinary people, who in their roles as adolescents, family members, students, businessmen, and citizens, appropriate technologies for their own purposes and in their daily activities actively create the future we are discussing.

## 10. Postscript

The first draft of this essay was written in 2003, as a contribution to an innovative EU forum project called VISION designed to explore possible futures in a very open way. While the original plan for the project—involving a core of researchers and academics who were to produce a variety of physical and electronic publications and a series of European-wide workshops on aspects of future society—has not survived, it has engendered a host of interesting discussions and contacts among the VISION participants. Recent technological projects such as Microsoft's *MyLifeBits* (Gemmell *et al.* 2006) expand on the technological dream/nightmare of recording everything that happens to a person, so this vision of an all-embracing memory device is still prevalent in certain communities. On the other hand, in the past couple of years, the topic of

forgetting has re-surfaced in a variety of fields—Paul Ricoeur’s magisterial tome in philosophy *Memory, History, Forgetting* (2004), Marc Augé’s insightful slim volume *Oblivion* (2004), ongoing work by geographers such as Martin Dodge and Rob Kitchin, to name a few—all of which argue for the value of forgetting, albeit by different agencies and in different settings. I hope to discuss this more recent work in future papers on the topic of forgetting.

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