The Crowdsourced Self: Digital Data Storage and Human Memory

I Historical Context

Since the 18th century, most Western cultures have used individual autonomy and privacy as foundational concepts for their social, political, and judicial systems. These Enlightenment ideals usually presume a stable individual self and, supporting that, a contiguous individual memory (without which full participation in the economic and political arenas is impossible). While the discrete individual remains the explicit premise of contemporary legal, political, and media discourse in the West, the past half century of scientific and philosophical research has qualified or, in some cases, disproved its bases, leading to a present situation in which neuroscientific understandings of memory are often pitted against cultural norms and commonplace assumptions. Western culture’s belief in the stable self is what Ramón y Cajal (the discoverer of the neuronal structure of the brain) described over a century ago as a “deep-rooted secular error” - by which he means something in which we need to believe, even though it is obviously not true (rather cheekily, he instanced “the belief in free will” as another of these).\(^1\) The true spirit of science and philosophy, says Cajal, “is oriented to . . . the destruction of these lay adaptations to errors, which may have been temporarily useful.”\(^2\) Unaided scientific evidence, however, has never been sufficient to dislodge a shared prejudice or desire that


\(^2\) Ibid, 2.
enough people believe in, and the contradictions between the neuroscientific and Enlightenment models of memory continue to grow and to generate more and more conflicts.

This paper analyzes how digital technology claims to liberate and augment our individual memories (and selves) in the traditional sense while it actually restricts and distorts them in ways that our culture already understands but won’t accept. We do this in three related sections. In the first, we explore the spectrum of memory models that enables this contradiction to persist. In the second, we compare the neural dynamics of individual memory to the operations of digital data storage and presentation to show how malleable, subjective, and borderless memory is in both cases. In the third, we analyze how (despite this homology) digital technology continues to explicitly claim that the exponential expansion, instant accessibility, and permanent preservation of the data relevant to our lives preserves our identity and liberates our thinking. These new storage technologies are marketed by appealing to old Enlightenment notions of personal identity and memory, but simultaneously require the largest surrender of privacy in the traditional sense that we have ever been asked to make as a condition of participation. What is so interesting about this surrender is that it is almost always described as a victory.

Part I

All Western models of individual human memory since Aristotle (scientific, philosophical, and otherwise) can be located on a spectrum that has at one pole a closed, static system in which the brain is a more or less reliable storehouse of information, a neural version of the government warehouse at the end of Raiders of the Lost Ark [SLIDE]. From an evolutionary point of view, it would appear that only a reliable
memory system would provide any fitness advantage to the organism; making reliable predictions in the face of incomplete information is greatly aided by the sort of fact invariance that static memory can provide. From an institutional standpoint, many modern disciplines blindly accept the closed and static view of memory. It is from this vantage point, following Karl Popper’s analysis of science, that general rules and relationships are most easily found and for which a straightforward generation of falsifiable predictions is possible.

At the other pole, the brain is an unreliable open system, prey to environmental influences of all kinds, in which the individual memory is embedded in and unavoidably influenced by the bodily, neural, social, and environmental networks in which it participates [SLIDE]. The accumulation of evidence since the 1980s has confirmed this view of an open, dynamic, and context-dependent memory, with evidence arriving from four related scholarly areas. In the psychological arena, Elizabeth Loftus, Daniel Schacter, and others have shown, that we cannot distinguish a true memory from a false one. At the neuromolecular level, Eric Kandel has proposed the prion theory of memory, whereby the molecular carriers of memory are forever altered during recall. From a philosophical perspective, Clark and Chalmers’ extended mind hypothesis has as its defining cognitive task the recall of memories in sources that exist outside the physical brain. Lastly, from an evolutionary point of view, a networked and open memory would have great utility in making the sort of contextual connections needed to make decisions in novel situations.

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4 FN to Chartrand and Bargh and Elizabeth Loftus
In fact, both poles on this scale are impossible for some simple neurophysiologic reasons. The purely static system of stored data that classical and Renaissance rhetoricians aspired to cultivate is impossible because it would be a terribly inefficient use of neural resources; our brains change, and therefore keeping a memory constant would be an expensive endeavor. At the other pole, a completely open and continually volatile individual memory would be useless from an evolutionary perspective. Between these poles lie the myriad compromised versions of memory that try to respect our desire for it to be fixed and, simultaneously, to acknowledge our experience that it isn’t.

Even these compromised versions, however, place memory at a point on this spectrum. Is there a sweet spot? (Pause) It is certainly much easier to construct arguments, scientific or rhetorical, if there were. The alternative is that memory is a second-order dynamic – it can float across this spectrum depending upon context and need. Again from an evolutionary point of view, such second order dynamicism would allow for the volatility of memory to be tuned to the volatility of the environment, similar to Dante Chialvo’s position that our senses tune to their environment.\(^5\) Repeatable environmental patterns would be stored in a memory that is functionally static and closed, even if the neuronal substrates are not. Transient patterns of experience, however, could be stored in a more volatile memory, reflecting the impermanence of the experience.

While many factors might work against accepting a second order dynamic and open memory, perhaps the most powerful rebuttal is our desire to be our remembered selves. We want to be who we remember we were. A stable self may be just a comforting illusion, but it is still a necessary one and it needs to perceive itself as consistent across

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time. On the other hand, admitting that the static self is a delusion, as some Eastern traditions have done (OTHER SOURCES?), seems to lead to relying entirely on an experienced self, watching who we are pass us by.

What sustains the contradiction between the neuroscientific and Enlightenment versions of memory, then, is that there is no stable middle ground between these two poles – memory, we know, is always dynamic, but we value it precisely because it fixes facts and experiences upon which we depend. But digital technology is causing the tension between these two poles to build.

Part II

The shift from closed/static memory models to open/dynamic ones has enormous implications for science, philosophy, and public policy. It has been a slow diffusive process, however, and despite the paradoxes created in the interim, it will take socio-cultural triggers to expose its tensions and implications. Our claim here is that the capacity (and the desire) to store our memories via digital technology has been just such a trigger and that, together with artistic representations of that process, it has begun to force a change in juridical, educational, and commonsense views of memory [SLIDE]. We are NOT proposing a sequential causal relationship whereby using digital data storage technology leads to accepting open system models of the human memory, but we do claim that a reciprocal set of concerns and blind spots connects them both.

The theory of neural dynamics sounded the death knell of the closed/static view of memory. According to the this body of research, the future of a neural system is

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dependent upon both its previous states, sorted in molecular memory, and its environmental context; the catch is that in passing through a state, the status of the neural network changes forever, and thus the system cannot return to that state at a later time. If you are your “synaptic self,” as Joseph LeDoux proposes, and your synapses are altered through use (as in, for example, a memorial recollection), then you are changed as well. David Linden expands this argument to include the entire neural system, ranging in space from ion channels to gross brain structures, and in time from ion channel gating to infant brain development and aging. The only stable internal continuity of selfhood is the endless flux of neuronal activity. Our perception of memorial stability is just that: a perception.

At first glance, however, digital technology seems to offer a way to pin down biological memories by encoding them in ones and zeros that are unchanging and available at all times. That is certainly how they are marketed. Take, as one example, Total Recall: How the E-Memory Revolution Will Change Everything (2009) [SLIDE], a record of a decade-long experiment in which one of its authors (Gordon Bell) digitally recorded every possible aspect of his life – every conversation was, where permissible, recorded; every email, instant message, and text message was stored; every paper document in his life (bills, newspaper articles, memos, greeting cards, receipts, . . . everything) was scanned. Some way into the project, he began wearing a miniature camera, which took pictures whenever it detected a change in the ambient light (signaling a new environment) or when a designated amount of time had passed. As the book’s title implies, digital memory is here being configured as an enormous prosthesis for our brain-based memory:

You will have the capacity for Total Recall. You will be able to summon up everything you have ever seen, heard, or done. And you will be in total control, able to retrieve as much or as little as you want at any given time.\textsuperscript{9}

Notice how careful Bell and Gemmell are to make sure that it is all centered on individual users, reassuring us that “you, not your desktop’s hard drive, are the hub of your digital belongings.” There’s even a rather sinister element of mental hygiene consciousness in their rhetoric of the digital memory: “It gives you kind of a feeling of cleanliness . . . I can offload my memory. I feel much freer about remembering something now. I’ve got this machine, this slave, to do it.”\textsuperscript{10} The not-so-subtle subtext here is: ‘your biological memories are defective and inadequate, and we will replace them with purer digital ones.’

Bell and Gemmell’s book might sound a little mad scientist-ish, but their research is funded by Microsoft and their book has a preface by Bill Gates. We are using their work as convenient limit case for all of the marketing strategies and human desires that are invoked by the fantasy of limitless, reliable, digitally-based memory. The problem, of course, is that digital technologies are just as open and dynamic as neural systems. At a macro level, technology is an open system that evolves, intertwined with economic, political, and environmental trends.\textsuperscript{11} At the level of individual users, data is constantly transferred between formats, often under heavy filtering. In the cinematic world, films have moved from 35 mm to VHS to DVD/CD to Blu-ray to MP4/3etc.; they have also been transformed in digitally-enhanced analog films, “director’s cuts,” and so forth.

each case, the underlying digital code of ones and zeros are altered to make them “better”
and, as Katherine Hayles and others have pointed out, require that the content in question
be reassembled and reprocessed every time.¹²

Even granting that ones and zeros may change, Bell and Gemmell make the
seemingly attractive argument that digital storage will offer:
the ability to relive one’s own life story in Proustian detail, the freedom to
memorize less and think creatively more, and even a measure of earthly
immortality by being cyberized—these are all potentially transformational
psychological phenomena (8).

They most certainly are, and they make a mockery of the earlier claim that we could
really control the organization of our memories into convenient narratives and useful
syntheses. And do not write off the “earthly immortality” claim as hyperbole: the authors
imagine this mass of stored personal data being combined with voice synthesizers to
create avatars of you and your dead relatives in order to enable a digital immortality:
“Imagine if you could have a conversation with your great-grandfather, seeing his face,
hearing his voice, and having your questions answered in your great-grandfather’s unique
turn of phrase” (151).

At their core, digital and biological memories share a crucial characteristic
relevant to any attempt to preserve a record for later use: meaning is always contextual.
As the surrounding contexts change, both digital and biological memories are
dynamically reconstructed and reinterpreted. Your memory now means something

¹² N. Katherine Hayles, How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and
different to you as events unfold. The openness of digital memories extends farther still as we use digital devices to record and share our memories with others in our digital social networks. The memories that compose “you” are no longer owned by you; just ask the avatar of your dead great-grandfather. Mix in social network sites and blog protocols that can update content without the consent of the putative author and those in your social network who can name, position, and represent you through links and tags. In fact, the new Facebook Timeline uses an algorithm to add context for you, organizing your life story into a narrative for you and your friends [SLIDE]. This is the crowd-sourced self, and as the viewer changes, so does the collective construction of “you.” [SLIDE]

If anything, digital memories are far more open than your biological memories, even if they are locked in some supposedly private computer memory vault (as Bell and Gemmell imagine). Almost all digital technology is predicated on being networked and exchangeable, so it cannot (by its nature) be the prop for the unified self that Bell and Gemmell and every smart phone ad in the world claim: because this is what we want, it is what advertisers will always promise. But they can never deliver.

Part III

Despite this homology between the workings of open-system memories and our digital storage networks, our culture (epitomized by Bell and Gemmell) consistently sells digital storage devices by appealing to Enlightenment ideals of augmented individual selfhood. What this does, of course, is imply an equivalency between the externally-imposed, networked versions of our desires and the supposedly independently-generated ones. Free will and memory, in the strong sense of these terms, are at best expendable and at worst illusory on this view, and digital technology companies aren’t very coy
about saying so. In a now-famous interview with the Wall St. Journal last August, Google Chairman Eric Schmidt was asked what Google will do once search engines can no longer deliver big profits [SLIDE]. His reply was “I actually don’t think that people want Google to answer their questions. They want Google to tell them what they should be doing next.”

Because of the information Google has collected about you, he goes on, "we know roughly who you are, roughly what you care about, roughly who your friends are." Google also knows, to within a foot, where you are. The next generation of handheld devices, he predicts will surprise us with information that we did not know we wanted to know: “The power of individual targeting—the technology will be so good that it will be very hard for people to watch or consume anything that has not in some sense been tailored for them.” The Wall St. Journal interviewer then experiences a momentary flicker of critical consciousness, but capitalist reality soon brushes it away. [SLIDE] The next tectonic shift in search technology, therefore, will be about anticipating and creating our desires, not merely catering to them. Once again, the digital technology that promised to set us free is openly shaping who “us” is, a classic case of an open and dynamic system. And Facebook evidently agrees, for their much-ballyhooed recent changes are also aimed at recording our lives and, not coincidentally, managing our consumption.

It is in the arts and media environments, though, that this paradox of old and new models of memory is becoming most manifest and where it is receiving its most thorough exploration; for the purposes of brevity, we will restrict ourselves to cinema and television. There are significant explorations of the paradox of memory in the most recent James Bond films Casino Royale and Quantum of Solace, in Roman Polanski’s Ghost

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Writer, and in the Bourne Trilogy (to say nothing of Inception, Memento, and the Matrix trilogy). Our featured example, however, is drawn from BBC television’s wonderful updated literary adaptation, Sherlock. Not to be confused with Guy Ritchie’s thoroughly uninteresting feature films, Sherlock sets Conan Doyle’s Sherlock Holmes stories in a contemporary London of closed-circuit TV cameras, government surveillance, and media saturation: Dr. Watson does not write stories for a magazine, he writes a successful blog; Holmes prefers texting people to talking with them (with the texts being represented on-screen for the viewer) [SLIDE]. What in Conan Doyle is Holmes’s eccentric manner is the modern Sherlock’s admission that he is a “high-functioning sociopath.”

The foundations of Holmes’s detective skill are his extraordinary powers of observation – Holmes can derive an incredible amount of knowledge about people just by looking at the details of their appearance, and the films represent this by literally tagging the people he meets [SLIDE0] with the information he can find in their appearance [SLIDES 0a-d]. As an audience, we are shown Sherlock’s thoughts, and these in a way that is clearly meant to represent Facebook picture tags. Holmes’s incredible brain power is thus conflated with a social media site that is designed to be open, networked, and accessible, even though his deductions are idiosyncratic, private, and often kept to himself. He has a great mind insofar as it works like a digital device. Likewise, he has an encyclopedic but very idiosyncratic memory. He knows London’s streets as well as a taxi driver. In one chase sequence, he stops to imagine the route a cab he wishes to follow must take [SLIDE 1] and then follows on foot, his mental picture of the cab’s route looking exactly like smart phone map directions [SLIDE 2-5]. Notice that he can overlay his own route onto the cab’s, and that it is impossible to tell if what we are seeing in the
rush of images is the contents of Holmes’s mind or the street signs that the cab is actually passing or both. The boundary between mind and world is completely open and imperceptible.

It is precisely this openness and connectedness that signals that he is NOT the embodiment of the Total Recall fantasy discussed above. This Sherlock Holmes may have an idiosyncratic mind that works like a combination between a search engine and a surveillance camera, but he is an open system and not a function of the sheer quantity of data. In one marvelous scene, for example, he is teased about the fact that he doesn’t know or care whether the earth orbits the sun or vice versa: [CLIP]

What Holmes points out here is what Bell and Gemmell completely fail to grasp: more data does NOT necessarily mean better decisions. Sherlock IS for all intents and purposes a digital memory, but this is what makes it harder for him to function in the world not easier – he is emotionally cold, often brutally insensitive to people’s feelings, and completely unaware of current affairs. Rather than liberation from the surly bonds of biology, however, this brings him the suspicion or dislike of nearly everyone he encounters (including Dr. Watson), endless frustration when dealing with “ordinary” people, and an almost suicidal problem with boredom. He is the embodiment of a digital memory . . . and most of human life is impossible for him. The writers who created this new dramatized Sherlock Holmes made him into a recognizable outlier inhabiting the digital age; they also created a perfect exemplar of the paradox of memory that we are analyzing. **Tinker Tailor Soldier Spy**

Cinema and the arts are, currently, the most prominent extant forum for exploring this conflict, can no longer contain it?
It is clear from the instinctive defense of our antiquated social, political, ethical and legal systems that our culture still clings to a static model of memory, whether biological or digital. Digital technology’s promise of permanence, in contrast with biological memory’s evanescence, wouldn’t be a main selling point for smart phones, iPads, etc. if it wasn’t striking a chord with us. But this belief is contradicted by the scientific and philosophical research that we have discussed and by everyday experience. The collective desire to digitize our experience, however, might just be the trigger that exposes this paradox of memory and prompts a system-wide change that will generate many confrontations and conflicts, especially since it is a bottom-up social process rather than a merely academic debate. In the very first paper of this conference, Robert McCauley mentioned Henrich et al’s essential article “The WEIRDest People in the World??” and it belongs here in the last one as well: as Bob McCauley said, this article gathers evidence that both cognitive functions and neural architecture vary widely across cultural and ethnic lines, and one of the most important variations it discusses is the relative importance that different cultures assign to the discrete individual. This means that this paradox may be primarily a Western problem, BUT it also means we are not condemned to it. So how are we to do this? We would like to leave you with this question: must we learn to live with this contradiction the same way we live with the contradictions of, say, capitalism, or is our historical moment the one in which the digital revolution will lead to explicit institutional changes?

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