

Keeping Our People Alive: The Role of Digital Immortality in Culture Preservation

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1. Introduction

The concept of “culture” is fascinating and complex. We are all born into cultures, we live our entire lives within cultures, and we help shape and maintain those cultures. We are also all involved in teaching and propagating culture, from person to person and from generation to generation. So you would think that by now we would pretty well know what culture actually is. Yet there remains considerable debate—even among culture scientists—as to what, precisely, culture is and is not. In fact, in just this last century the concept of culture underwent radical rethinkings, reconceptualizations, and redefinitions; and we’re still not through with it.

One reason we’re not through is that today’s relentless pace of technology development is changing—in some cases, even radically changing—the very nature of culture, our views of culture, and the ways cultures arise, evolve, and die. It is also changing our thoughts on how future generations might view culture and how they will want to and be able to explore their past cultures, especially in ways that we can only dream of today; whatever the answers are, they will certainly be far different from today.

Regardless of the chosen definition of culture, it seems most culture studies are fundamentally race or ethnicity based. In the following discussion, however, I focus instead on non-genetic based cultures, such as psychographic cultures, micro-cultures, sub-cultures, and especially family cultures. Because these types of cultures are more ephemeral, they make it easier to explore some of the ways that culture, culture preserva-



Digitale Speicherung und vernetzte Kommunikation ermöglichen in nie gekanntem Umfang die Aufzeichnung kultureller Inhalte und deren Überlieferung auf die Nachwelt. Zugleich sind Speichermedien alles andere als haltbar und es droht ein Ertrinken in der Informationsflut. Gilt der Satz: „Gespeichert, das heißt vergessen“? Die Wechselwirkungen zwischen Medien und Kultur haben sowohl eine technische, als auch eine soziokulturelle Dimension und prägen zugleich gesellschaftspolitische Wandlungsprozesse - Prozesse, die eine Fülle weitergehender Fragen aufwerfen und Handlungsbedarf begründen.

Die im vorliegenden Band versammelten Diskussionsbeiträge von Experten unterschiedlicher Fachrichtungen dokumentieren ein Symposium, das im Frühjahr 2005 in Karlsruhe stattgefunden hat. Die Beiträge bieten eine umfassende Grundlage für die auf politischer Ebene zu treffenden Entscheidungen.

Kulturelles Gedächtnis im 21. Jhd.

Dreier / Euler

Dreier / Euler (Hrsg.)
**Kulturelles Gedächtnis
im 21. Jahrhundert**
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tion, and culture exploration are changing as a result of current technology developments.

The goal of this paper is to help contemplate potential ways future generations—with future technologies that we can barely imagine today—may want to use and explore the cultures in their past, and to then map these views back to our current methods for defining, capturing, and preserving our contemporary cultures for use by these future generations. In particular, I try to explore the possible integration of “digital immortality” and “virtual human” technologies and concepts with those of culture preservation and exploration. As far as I am aware, research efforts devoted to these technologies have not yet targeted culture preservation problems; therefore most of the following discussion is thorough speculation on my part.

2. Digital Immortality & Runaway Technology

Two important concepts underlie the following discussion. Unfortunately, there is scarcely room here to adequately introduce them, much less give them the respectful treatment they deserve. Interested readers, therefore, are encouraged to research these concepts on their own; my apologies.

The first concept is the *exponentially increasing power of computers*; it relates to Moore’s Law, Kurzweil’s law of accelerating returns, and several related technology predictions. Although the rates and speeds of increase are debated, more than a few people adhere to the view that these laws (modified by many other factors) imply that computers not only have been but will continue to double in computational power approximately every 12 months. Over any ten-year period, this implies a thousand-fold increase in computing power; twenty years implies a million-fold increase; and so on.

These rates are often used to project various computational milestones in the future, two of which state that: 1) by the year 2020 (or thereabouts), the raw computational power of a single computer will be equivalent to the power of the human brain, and 2) by the year 2050 (or thereabouts), the raw computational power of a single computer will be equivalent to the combined brain-power of all of mankind. Truly phenomenal impli-

cations result from this view of the future.

The second major concept needed is *digital immortality*. There are many definitions and different views surrounding the concept of digital immortality, ranging from the mundane and straightforward all the way to the truly mind-numbing. It may not seem so as you read this paper, but I have tried to limit the discussion to the mostly mundane, plain vanilla aspects of digital immortality in what follows. Thus, if anything, the views and statements I present below are more likely understatements than overstatements.

As a hopefully minimalistic definition then, digital immortality can be roughly considered as involving a person-centric repository containing a copy of everything that a person sees, hears, says, or engenders over his or her lifespan, including photographs, videos, audio recordings, movies, television shows, music albums/CDs, newspapers, documents, diaries and journals, interviews, meetings, love letters, notes, papers, art pieces, and so on, and so on; and if not everything, then at least as much as the person has and takes the time and trouble to include. The person's personality, emotion profiles, thoughts, beliefs, and appearance are also captured and integrated into an artificially intelligent, interactive, conversational agent/avatar. This avatar is placed in charge of (and perhaps "equated" with) the collected material in the repository so that the agent can present the illusion of having the factual memories, thoughts, and beliefs of the person him/herself.

In ways that will hopefully become apparent in the remainder of this paper, such an all-encompassing repository coupled with an intelligent, emotional, conversational "human like" agent that pretends to be a specific someone (e.g., you) can provide several benefits similar to those that might arise were that person him/herself to have continued living, perhaps indefinitely. The thinking is that if you can't hang around forever, why not create a surrogate who (that?) can. This is one of the weak senses of "immortality" as used in "digital immortality." Even with this weak sense, though, you might be amazed by some of the possible implications for culture preservation and exploration.

In what follows, I focus on personal digital immortality as a valuable, desirable, and unifying concept that stands to change the way we and future generations will come to approach the activities of culture pre-

servation and exploration; I use the concepts related to Moore's and Kurzweil's laws only to help persuade you that much of what follows is certain.

3. The Art of the Long View

We should clearly expect significant and fundamental changes to the fields of culture preservation and exploration in future years as a result of the continuing onslaught of technological innovation. While many of these changes will be incremental, others will prove outright disruptive. Thus we are forced to take the "long view" into the future to attempt to anticipate what might then be the state of the art in tools, methods, media, and motivations that our long-distance, future generations will use. The task is not to predict the future but to anticipate the most likely alternative futures and to comprehend a set of scenarios by which they might arise (see Peter Schwartz's excellent book, *The Art of the Long View*, for example). Once formally developed, these scenarios can then be used to more adequately shape the nature of today's research and culture preservation activities so that they contemplate possible effects of massive technological innovations.

How far into the future should we look, though, when conceptualizing how future societies will want to and/or be able to explore and preserve all the cultures they inherit from us? We ourselves have preserved cultures stretching back at least 5000 years; but surely there is no possible way for us to project that far into the future with our technologies and our perceived evolution of cultures. Looking 2000 years back is, for us, significantly easier, as these years have been fairly extensively captured in various historical and cultural documents. Perhaps we should use 2000 years into the future as an upper limit on our visioning processes; and if that is too uncomfortable, maybe 1000 years is a good upper limit. Regardless, it is sometimes easier to speak in terms of numbers of generations rather than in numbers of years. This is particularly useful when discussing digital immortality, and especially personal digital immortality when carried out for the benefits of one's descendants.

The number "ten generations" is a good one. It is useful to imagine what it would be like if our own descendants could look backwards into

their family tree and find all those ancestors digitally preserved, virtually alive, and ready to talk! If we consider one generation equivalent to 25 years, then ten generations is only 250 years—far less than 1000 or 2000 years. Surely we owe it to future societies to contemplate more than the next measly 250 years.

On the other hand, given the exponential increases in computing power, think what a mere 250 years means with respect to the future power of computers. As Mister Rogers might have asked, “Can you say ‘inconceivable?’”

4. Technology, Culture, and the Future

Many recent books document the phenomena of Moore’s Law, Kurzweil’s Law, the exponentially increasing rate of developments in technology, and the dizzying array of results that are predicted to ensue. Very few, however, contemplate possible effects at the level of society or human culture, and fewer still systematically contemplate the fundamental changes they are injecting into the culture sciences, the nature of culture, and the important human endeavors of culture preservation and culture exploration. So at present, most discussion of the futures of these fields is thoroughly informal and speculative, including this one. This situation is ripe for a remedy.

In culture science, as in any other field, the rapid pace of technology development is proving to be a double-edged sword; it is creating both numerous problems and numerous opportunities. Fortunately, culture professionals are already aware of many of the emerging problems, and they have initiated multiple large-scale, government-funded efforts to address them.

Understanding and exploiting the opportunities is more problematic, for several reasons. First, culture professionals are more adept at integrating technology rather than inventing it, driving it, or contemplating its directions. Second, many of the benefits of adopting particular technologies might not materialize for years, perhaps even generations, especially since many of the beneficiaries of our culture preservation activities haven’t even yet arrived on the planet. Thus user-centric, activity-based research is difficult.

Fortunately, though, several advanced technology innovations are already being explored, so we are getting some early glimpses into the future; examples include 3D and panoramic photography of material culture objects, navigable virtual museums, artificially intelligent virtual tour guides, and many innovations in human-computer interfaces, to name only a few. There are longer-term opportunities as well, many of which have not yet made their way into mainstream culture research. Some examples of these, to again name only a few, include self-organizing personal micro-culture archives, virtual humans, virtual time travel, the democratization of culture preservation, and as already mentioned, digital immortality.

Today's Magic is Tomorrow's Paperclip

Among research projects attempting to exploit emerging technologies, several are exploring the creation of high-fidelity, photo-textured, 3D graphic models of large archaeological structures (e.g., the Acropolis, the Temple of Solomon, and the Giza Plateau). These models can be rendered in real time, in textured 3D, and interactively “traveled” through; furthermore, they can be populated with animated, computer-generated characters that wander through the 3D site, dressed in clothing of the time and performing typical daily tasks. These capabilities mean that you can now “virtually visit” archaeological sites, randomly walk through them, and get a vague sense of “being there”. (Readers familiar with immersive 3D computer games such as *Doom*, *Quake*, or *Unreal Tournament* will readily appreciate the huge implications of these capabilities.)

While these 3D “virtual reality” and “virtual visitation” capabilities are relatively new and fascinating to us (at least within the culture sciences), they will be ubiquitous, thoroughly commonplace, and taken for granted by future generations. When future generations explore their past cultures, they will want and expect, as a matter of course, to be able to virtually visit and walk through the buildings, malls, cities, vehicles, and homes of those cultures. Further, where today we populate our 3D culture-worlds with brute-level automatons, theirs will be populated by artificially intelligent, artificially emotive, autonomous, personality-driven simulated beings or something even more sophisticated that we can't yet imagine; this too will be ordinary to them.

Arthur C. Clarke once pointed out that, „Any sufficiently advanced technology is indistinguishable from magic.“ Taking a future-based viewpoint and looking backward, however, an analog to Clarke’s statement might be, “Today’s magic is tomorrow’s paperclip.” It points out the inevitable “de-astonishment” of any of today’s most advanced technologies in future generations. As a result, all our current “gee whiz” technology-based innovations, including those mentioned above, will at some point become thoroughly commonplace to our descendants. In the process of becoming commonplace, however, some will have become essential core technologies and will have spawned many new methods and practices within culture preservation and exploration. (Consider the effects of the invention of paper, which itself was once considered an amazing technology.)

5. Digitalization of Personal Cultural Artifacts

Perhaps the most significant influence to date of technology on culture and culture sciences has been the digitalization of storage, transmission, creation, manipulation, and interfacing of most forms of media, information, and communication. As a result of this digitalization process, we are living in an age where more and more cultural artifacts are digital. Most of society’s photos, videos, movies, and music all live entirely within the digital world now. Furthermore, many of society’s repositories of knowledge and data are being moved entirely into the digital world. Even things that don’t start out digital often end up digital, as they can now be converted to or replicated in digital format, using scanners, digital photographic cameras, digital video cameras, or other image and data capturing devices.

It is not only society and mass culture that have undergone this digital transformation; our personal lives have also been hugely transformed by this digitalization process. The number of objects, events, and aspects of a person’s life that can be captured and stored on computers and digital media is staggering, by any measure; and the amount is continually increasing year by year, decade by decade, generation by generation.

Archiving Your Own Personal Cultural Artifacts

One key result of this move to digital lifestyles is that many people today are experiencing the phenomenon of having increasing amounts of digital “stuff” from their personal lives accumulated and stored on their own personal computers, much of which is unique and much of which they themselves have created; many constitute true cultural artifacts. Years worth of photos, home videos, letters, and personal diaries/journals that they created in the past are things they now save on disks/discs; they are thus available for retrieval and reuse, should the need arise.

We probably tend to think of these accumulations as backups or archives from which we can retrieve something, if we ever really need to. But it may be more appropriate to start thinking of them as time-based repositories, even time-based personal culture repositories, that provide a view, of sorts, back through the years of our lives, and that we are maintaining not so much for our own use but for use by our descendants.

By the time we and other current generations of people reach old age and approach death, many of us will likely possess huge repositories of digital stuff, much of which will be personal cultural artifacts and whose lifetimes span many years. All the “stuff” in these repositories will have been organized, indexed, documented, and annotated—by intelligent software agents, if not by us—and archived for future use. If you then choose to do so, you can easily and cheaply preserve this giant personal information and culture archive, make a number of identical copies, and leave a copy to each of your children.

You Are the First of Many

If you do in fact decide to leave a copy of your preserved digital “stuff” to your children, they might later on choose to bundle all your stuff with all their stuff and leave copies of the combined result to each of their children; and so on, and so on, generation after generation. You will be the first, however, as this capability has never before been presented to mankind. We are truly at one of the most significant turning points in all of history, and our descendants will view history and connect to their own personal histories in ways that we can barely imagine.

Just consider what one of your own descendants ten generations down the line might like to inherit from you (along with all their other ancestors, of course—all 2^{10} of them!)—stuff that, among many other things, could allow them to explore in detail their personal family histories, the many family cultures from which they derived, and even individual ancestors, such as you. Perhaps they will want to explore your memories, thoughts, and culture, and perhaps even to “talk” to you and “get to know” you on a first-hand basis. By becoming digitally immortal, you will grant their wish.

6. Talking to Dead Relatives

In the movie *Minority Report*, based on Philip K. Dick’s book of the same name, John is a seriously grieving father whose young son, Sean, was violently murdered several years ago. John has never gotten past this event, and he now is deeply melancholic. When life becomes emotionally rough for John, he likes to go home and “talk to” his dead son Sean. He does this by whipping out one of the many home “movies” of Sean that he took over the years and replaying it. The technology available in John’s time provides for a holographic projection of Sean to take place during the movie’s playback, so that John actually sees a 3D rather than a 2D recreation of Sean and the recorded events.

The important thing to note is that John talks to Sean during the playback. Video cameras capture not only the video but also whatever sounds and conversation are simultaneously occurring, including, of course, the speech of the camera operator, if any. When people take video of their children, they frequently talk to them from behind the camera. This is what John has done, too. So whatever conversation John and Sean had at the time the movie was made was captured by the video camera, and John was directly involved. Now, years later, as he watches the video, when it comes time for him to talk in the video, John talks in real life, echoing the words he said at the time of the original recording. Appropriately, Sean answers his father—on video. But for John, it feels as if Sean is answering now, in current time. John re-experiences the emotions of actually talking with his son, or at least some portion of them—certainly enough to help him with his need and desire for feeling the love and affection for his son. This is key.

John has no illusions about his son's being dead. John is not being tricked into thinking Sean is alive once more. There is no Turing Test involved that the recorded Sean has passed. And any "suspension of disbelief" (see below) is willing rather than forced. Nevertheless, for John, this is a highly rewarding experiential activity, and—as you can observe in the movie—it is one he has engaged in so many times that he has the timing down precisely. He knows precisely when he should speak and how to do so. Clearly he has done this many times, perhaps a hundred or more; yet the emotional payoff is so high that he eagerly re-engages the experience.

The movie *Superman* provides another, richer visualization of this digital immortality aspect. Inside Superman's Fortress is a computer system capable of projecting interactive images of his father and mother. Superman can ask them questions, and they reply. More than this, they can engage in deep, complicated dialog. Behind the recorded father and mother lies a massive knowledge and information repository, including numerous images, sounds, and other media. The father and mother use them as needed during their conversations with their son.

Superman's father and mother previously created and preserved this system for him before their deaths, knowing he would find it useful and valuable as he grew up. When Superman comes to visit, the virtual father and mother provide not only this recorded information and knowledge, but also their love and affection for their son. Superman feels this while he talks to them, and he inevitably begins to evince his own emotions. At once point, he reaches out with his arms to embrace his father. When he realizes what he has done, a momentary embarrassment creeps over him.

A critical point to note is that Superman too is under no illusion that his parents aren't dead; there is no passing of any form of the Turing Test involved; and there is no trickery involved. Only willing suspension of disbelief is involved for Superman to obtain a genuinely emotional experience of interacting with his own parents, both of whom he quite well knows are dead.

Personal digital immortality offers the same possibility to you and your descendants. In fact, think of what it would be like if you had digital repositories and animated, conversational, 3D image interfaces of all of

your ancestors reaching back ten generations. Imagine that you could talk to any one of them, asking them whatever questions you might want, including questions about themselves, their generation, and their culture.

Unfortunately, this ability is unavailable to us, since the technology wasn't available to our ancestors, especially not to those 10 generations before us. But the technology is available to us now (or very soon will be), so we can in fact start the ball rolling. You can (and should!) take steps now to become the first in a long line of digitally preserved and recreated ancestors for your descendants.

7. The Preservation of Cultural Icons

Culture Preservation, as practiced by culture scientists and professionals, does not typically involve itself with the preservation of individuals unless those individuals have become cultural icons of some sort. Usually, but not always, these are individuals that have achieved a level of fame (or infamy) that transcends their lifetime, and they have somehow come to represent significant aspects of their respective cultures. Throughout most of our history, the cultural preservation of such people has typically had to rely on small numbers of artifacts—for example, biographies, correspondence, personal diaries or journals, a handful of photographs or drawings, collected tales concerning the individuals, and artifacts produced by the individuals, if any (e.g., their writings, art, or music). Given the technology cornucopia of today, however, it has become far easier to collect and preserve vastly more cultural artifacts related to a specific person, and many more people are getting involved in the preservation act.

Rock musicians are currently a strong favorite. For both mass culture and micro-culture musicians, you can generally find multiple web sites devoted to collecting and sharing huge amounts of information and large numbers of artifacts from a musician's life and career. You will likely find numerous photos, album art, lyrics, tablatures, downloadable playable copies of the musician's music, audio/video interviews of the musician, fan-mail, digital scans or reproductions of important documents, posters, ticket stubs, paintings, site-visitation logs, devotional comments by ardent fans, and even QTVR photos of the musician's home or stu-

dio. You might also find auto-/biographical e-books, professional critical analyses of the person and his/her music, rockumentaries, and much, much more.

Clearly it is becoming easier and easier to culturally preserve people—lots of people—including people who may not even be cultural icons. Consequently, future generations will definitely inherit far more culturally preserved people than we did.

8. Interfacing with Dead Icons

These rich, sophisticated, cultural-icon based web sites constitute some amazing, technologically advanced, information-centric repositories of culture. Unfortunately, we might at best typically consider them as interactive, digital equivalents of museums or perhaps digital encyclopedias. While their information value is enormously high, visiting one can prove quite painful and relatively unproductive. Even though they are interactive, they are presently limited to the still primitive levels and modes of interaction that currently dominate the Internet and the Web.

Chatterbots & Conversational Agents

Many projects are exploring natural language query interfaces; while sometimes a definite improvement, they too can prove painful, for several reasons, not least of which is that most still require you to type your queries. Additionally, most treat each query as if it were independent of all others you have so far made. Consequently, you cannot engage such systems in a meaningful query dialog—at least not yet.

One encouraging development is the huge effort being expended on natural language, conversational interfaces whose main purpose (at present) is exploring the limits of simply pretending to engage in a dialog with you. They represent a significant, new approach to building conversational interfaces, as they eschew the primary role of artificial intelligence and focus instead on providing a satisfying illusion of intelligence. The thought is that sometimes it is far more enjoyable for a user to engage a skilled conversationalist with average smarts than a conversa-

tionally challenged know-it-all, even—and this is important—if you are tricked into thinking the system was reasonably smart. In other words, these systems focus on the experience of talking with them more than on the results of performing some particular task. Such technologies are suited to “companion”-type applications rather than servant/worker-type applications. This approach is hotly debated, as you might imagine. Numerous examples can be found on the web.

Talking Heads

Another interface technology being explored is that of conversational “talking heads”. One of the central goals of these efforts is the creation of visually realistic animations of human-like characters (generally bust shots or heads only) that provide the illusion of holding an intelligent, meaningful conversation with you, but which use animation, graphics, and/or video of the character’s face and head to help convey a sense of emotion, personality, and realism. Although today most experimental talking heads are limited to text dialogs, many will soon use voice recognition and synthesized speech interfaces; at that point, you can freely speak to them and they will speak back.

There Are Many More Approaches, Too

Many other forms of advanced interfaces are being explored as well, including intelligent query engines, 3D visualizations for document retrieval systems, haptic feedback, and even immersive virtual reality navigational interfaces. (The 1994 movie *Disclosure* provides an inspiring visual conceptualization of virtual repositories using a virtual angel as a host/guide.)

9. Turn Me On, Dead Man:

John Lennon as a Talking Head

There are already numerous web sites devoted to the preservation of cultural icons (and the Web is probably still younger than most people on the planet). As just discussed though, most use passive, third-person interfaces; thus visitors to these sites can only learn “about” and not “from” the person on whom the site is based. This limitation also prevents visitors from “getting to know” the person or to come away with the feeling of having actually visited the person. Personally, that would bother me, as there are quite a few dead people I’d like to meet and not just read about.

There are some icon-centric sites, however, that are actively exploring the integration of talking-head technologies into their sites, hoping to let you speak directly to the person and engage them in simple dialogs. Examples include projects focusing on Einstein, Elvis, John Lennon, Jack the Ripper, Hans Christian Andersen (a very sophisticated effort), and Jackie Strike, a fictional Presidential candidate (technically, she doesn’t qualify as a culture icon; but the project is so impressive that I included it here anyway). Not all talking-head projects are coupled to cultural-icon preservation projects, so there are in fact many talking-head systems you can go chat with, if you are interested in exploring the state of the art, independent of culture preservation activities.

The most publicized of these projects is perhaps the John Lennon AI Project (it certainly isn’t the most sophisticated, and its development seems to have lagged). The project attempted to artificially recreate Beatles member John Lennon by programming an artificial conversation system based entirely on Lennon’s own, historically documented words and thoughts. Unfortunately, it achieved only minimal success.

The Hans Christian Anderson project, on the other hand, is quite sophisticated. You can visit Hans in his home and office, and you can carry on a modest conversation with him about many aspects of his life and writings. While you do, he wanders about in his office, sometimes turning toward you to speak and other times turning away. It is admittedly

an early prototype, it lacks photorealism, and it isn't likely to evoke any emotional responses within you, but it provides another glimpse of what is possible and what is coming.

The general approach in building a human-based talking head system is to take a fairly large collection of the records of a person's conversations, activities, interviews, diaries, journals, school transcripts, school essays, love letters, and such, and to use these to construct an engaging, high-fidelity, first-person conversational system that pretends to be that person by using the information in those records to construct possible conversations. Because these systems are based on real people, they are constructed in such a way that everything they say, including their replies to questions, are either: 1) somewhat like the real human is imagined to have answered those questions, or 2) perhaps strictly from actual statements or recorded thoughts and memories of the real human, as found in the person's archives.

Based on predicted continuing technological advances in artificially emotive, conversational agent technologies, these projects anticipate reaching the point where visitors to the sites can freely converse with the artificial persons—e.g., Hans, John, or Einstein—asking them any question you want about their lives, beliefs, memories, or whatever, and have them render personalized, chatty replies based directly on both the content of the underlying knowledge-base as well as an artificially emotive personality simulation.

In the case of the John Lennon AI Project, visitors can (and do) ask John about his early childhood and family, his favorite song, why Yoko, his thoughts about being a Beatle or about Ed Sullivan or whatever. Not that he can yet answer them all, but if there is an answer, or if a reasonably believable one can be constructed by the system, it will be given to you; and if given, you can be pretty sure that he gave that answer (or something like it) sometime during his life.

10. You Too Can Become a Talking Head

How does all this relate to you and your personal digital archive of “stuff”, the one you plan to leave to your children and all future descendants? Well first, it is already possible to have a (basic) talking head

created out of you and your personal cultural archive. The result might not currently be hugely compelling as a “virtual you”, but it will be conversational, it will be high-fidelity, and it will be potentially useful for several purposes. Furthermore, in later years it can be upgraded and highly improved. In fact, even after your death, your talking head can be improved and have its capabilities extended. So as the technologies improve, your talking head can be improved, even without your involvement.

For people who have neither the time nor interest in doing this to themselves, there are several companies that provide personal, talking-head creation services (including ours). The resulting talking head implementation of you can be as factual as you want it to be, or you can allow some “artistic license” in its creation; doing so might make it (you) more conversationally skilled but less faithfully representative of you.

Photos (and other image types) can be linked into appropriate parts of the conversational database and also shown to the visitor when appropriate. Audio recordings can also be similarly integrated. This would allow your talking head to “show” or “play” something to a visitor, even if it could not describe or discuss it. The system would be modular too, so that you could add more and more knowledge, memories, beliefs, or whatever as time goes by. Future system designs will let you set your up system so that new information components are automatically added and indexed into the information database, even if they are not made part of the conversational component.

In essence, you can personalize your talking head in whatever way you want. Much of its ability will result, though, from the amount of digital stuff that you have taken time to add to your repository, so clearly, the more the better. Constructing such a system is far from trivial, but it is indeed doable; and it’s getting easier with each passing year.

11. Computer-Generated People

Actually, when it comes to computer-generated people, we can already go well beyond talking heads. Computer graphics technology, for example, can now render thoroughly photo-realistic images of humans, many of which are quite visually stunning. The results are often so compellingly life-like that most people have a hard time determining whether

an image is of a real person or a computer creation.

These computer-generated people have proven so realistic that several international modeling agencies, including Elite, have added digital female models to their rosters; clients can contract for the use of these digital models in their photo shoots just as they would for human models, only for far less expense. One agency holds the annual *Digital Beauties* beauty contest for computer-generated, female models. Winners are offered a modeling contract with the sponsoring agency. Digital people are entering our lives in other ways as well.

Computer-Generated Movie Actors

Besides computer-generated images, computer technologies will soon reach the point where we can create fully articulated, thoroughly photo-realistic, animated artificial humans for use in videos and feature-length movies. While the technologies involved are different, you can nevertheless explore the potentials of this capability in movies such as *Simone*, *Final Fantasy: The Spirits Within*, and *Immortal* (Enki Bilal's).

Final Fantasy was one of the first movies to attempt the use of only computer-generated actors with high levels of photorealism, and it was quite successful in doing so. Actor Tom Hanks, in an interview following the movie's release, even expressed concern about future competition over roles with these computer generated characters. One of the promotional posters for the movie shows the face of a somewhat wrinkly yet approachable, older man; the poster's caption reads, "Hi. I'm Charles, and I'm not real." The clear intent is to confuse and impress the viewer; and it does. Without the caption, most people would simply assume that Charles was indeed a real actor.

The movie *Immortal* presents another glimpse of using computer generated humans in film, as it freely intermixes humans with computer generated actors in ways that make it difficult to determine which actors are human and which are computer-generated. Complicating this determination is the fact that even with the human actors, parts of their faces and bodies are computer generated. Several other movies illustrate the advances in computer-generated actors, including *Monsters Inc.*, *The Incredibles*, *Game Over*, and the older TV show, *Reboot*.

Virtual Humans

We will also soon reach the point where we can, with computers, create virtual humans. These virtual humans will “live” entirely within the computer but, for all intents and purposes, will appear to be “real” humans. These “virtual” humans will possess artificial intelligence, artificial emotions, and artificial personalities. Many will be thoroughly photorealistic and even non-visually differentiable from real humans (at least as seen on television, in the movies, or on a computer screen). They will have synthesized memories and belief systems; they will have interests, skills, likes, and dislikes. And they may possess massive knowledge databases.

We will be able to see them face to face, to speak with or type to them, to hear them speak—even in very enjoyable, human-like voices, and to engage them in non-trivial, meaningful conversations. They will come to know you, to remember you, and to remember your previous interactions with them. You may be able to join some of them in virtual reality arenas for playing games, much as you can now do with game-bots in computer games such as *Unreal Tournament* or *Half-Life*, or even *The Sims*.

If this sounds far-fetched, it isn't; it is actually quite tame compared to what researchers believe is coming down the road.

12. A Computer-Generated You

Creating a 3D computer-generated image of you is easily done. In some cases, only a few photographs of your face and head are required to create a three-dimensional, somewhat satisfactory photorealistic model of your head. This 3D head model can then be coupled to software systems that manage speech synthesis, lip-synching, animation, and artificial lighting techniques to make your head essentially “come alive”. This head could serve as the animated, visual component of your talking head system, if this is the kind you prefer (personally, I prefer video-based approaches). Your eyebrows would move, your eyelids would blink, your head would sometimes tilt and bob around, and so on.

Instead of supplying only a set of photographs, you might alternatively provide some video footage taken of you in the process of talking, answering questions, and expressing emotions with your facial movements.

With this video material, an even more realistic talking head representation of you can be created. This is one of the approaches we are pursuing, with systems we call VideoBots™ and VideoDIMS™.

For all practical purposes, you would look quite real, either way—especially to visitors who don't know you. Whether your own spouse, children, and other family members would be able to readily differentiate your real head from your virtual head remains to be seen; but even if they can, it won't be too many generations before none of your descendants will be able to, for the simple reason that they will never have met the “real” you anyway—only the “virtual” and “digitally immortal” you.

Voice Cloning

What about your voice? It is certainly possible today to use recordings of your own voice, with all its aural and speech qualities, as the basis of an artificial voice and speech synthesis system. Using synthesized speech based on your voice, your digital immortality agent/avatar could then reply to questions in your voice, read your letters or diaries in your voice, sing songs in your voice, and even more. Your descendants could then not only talk to you, but they could hear you reply in your own (synthesized) voice. (I urge you to record your parents now and every few years, while you can, even if you don't actually voice clone them for years to come; you could even leave this for your children to do, sometime, if you aren't interested, but you really must have their recordings. Send email for help.)

Artificial Emotions and Personalities

There is a huge amount of current research targeting the creation of artificial emotion and artificial personality systems. Only recently has it become acceptable to explore such capabilities, as the inner workings of the brain and all its neural mechanisms were only vaguely comprehended. But with the huge advances that have recently taken place in the neuro and cognitive sciences, these topics are now being avidly pursued.

Most research in these areas, however, deals with completely artificial personalities and emotions, such as are intended for games, humanoid

robots, and artificial humans. The goal is to create believable, human-like behaviors and responses to a wide variety of stimuli.

So far, though, most research has focused on mechanisms and processes. Consequently, the research community has not yet significantly focused on creating and simulating specific personalities and specific emotion profiles based on real people, such as Elvis, let's say, or of your Grandmother. But we are not far from being able to do so. When we near that point, one of the key data components for these systems will clearly be detailed profiles compiled from multiple personality and emotion tests. At that point, the artificial emotion and personality systems of your computer-generated, virtual human interface will be able to mimic the idiosyncratic behaviors, mannerisms, and responses that we associate with specific individuals and personality types. Clearly, one can be created that will mimic your emotions and personality. So take your tests and toss them too into your repository.

13. Putting it All Together

Voice cloning, talking heads, artificial emotions, and artificial personalities are only a few of the technologies within the “virtual human” arena that can be exploited for the purposes of constructing a personal agent/avatar interface for your digital immortality archive. All these component technologies can be integrated in many different ways, and not all components have to be used for a given approach. So clearly many types of digital immortality systems can be designed. The choices are yours, and you will have many of them.

Think of HAL for example, the computer in 2001: *A Space Odyssey*. HAL possesses significant artificial intelligence, artificial emotions, emotive voice synthesis, speech recognition, and even lip-reading capabilities. Yet HAL was without visage—i.e., no talking head, no visual interface (unless you count his blinking light as one).

The computer-generated, animated, conversational Dr. Know in the movie *A.I.* portrays another possible vision of what an emotional, personality ridden, interface might be like—one with a head, no less, but no body. Further, the head is a cartoon head. Admittedly, this vision is neither satisfactory nor impressive compared to what is currently possible.

Unlike HAL, Dr. Know is essentially a talking, interactive encyclopedia or at best, an extremely intelligent research librarian. He certainly knows a lot, and he is friendly, personal, and emotive. Nevertheless, he inherently constructs a distinct intellectual, emotional, and interpretive barrier between you and the objects of discourse, especially when those objects are specific people.

Suppose someone in the distant future develops a desire to learn about Elvis and then goes for a visit to one of the massive, online web sites devoted to “all things Elvis.” What sort of interface would that person like to talk to? Clearly not some Google-like interface. But what about Dr. Know? No; well, perhaps. The problem with a Dr. Know interface is that the visitor is restricted to third-person queries and so can only talk *about* a person rather than *to* a person. I don’t know about you, but when I go to an Elvis site, I want to talk to Elvis himself; and if that’s not possible, then maybe Priscilla or Vernon; Dr. Know is way down on the list. And I certainly want an ongoing dialog, so that I might be able to ask questions like, “No kidding!? Then what did you do?”

14. Recording Your Entire Life

In many ways, creating a personal cultural repository over your lifetime amounts to “preserving” yourself in digital storage, albeit indirectly. What that means and what the value would be of doing this has a broad range of answers. One very simple, straightforward illustration of the value of doing this is illustrated in the movie, *Final Cut*. The story involves the organic implantation of Zoe chips into the brains of various people for use in recording everything the person sees and hears throughout their lifetime. When a person with a Zoe implant dies, the chip can be extracted and sent to a “cutter” who explores all the recorded material, selects bits and pieces from it that represent the person, his/her accomplishments, most memorable experiences, expressions of love to and from others, and so on. These selected materials are then composited into a video memorial that is shown during the funeral memorial service for that person, letting people vicariously relive the life of their loved one, through that person’s eyes. Unfortunately, the story’s treatment of the personal memory archives of a person ends with the memorial service; no further elements of digital immortality or culture preservation

are examined. Nevertheless, the movie's visualization of concepts related to personal digital immortality are quite engaging and should not be missed.

The concept of capturing everything a person sees and hears during a lifetime and then storing it all on digital storage media is actually quite possible. With the ever-declining costs and the ever-increasing capacities of digital storage media, it is estimated that a person's entire life can be held in several hundred of terabytes of storage, or thereabouts, and at prices in the not too distant future that will render this affordable by most. Unfortunately, while there are existing techniques that we could consider for use in capturing the audio and video data, none are yet fully "comfortable" and ready for 24/7 wearability, as would be a Zoe implant. So for now at least, we must resign ourselves to a high degree of manual involvement in the process.

Along with everything else you capture and store, many of the items finding their way into your repository will be true cultural artifacts. Since culture scientists adhere to the fundamental belief that we can learn about a culture group by studying the cultural artifacts left behind by that group, then all you have to do is ensure that you leave lots and lots of culture-related stuff behind—in your repository—and future computer-based tools can probably be fairly successful at "extracting" you from the repository in some future year, for the benefit of your personal descendants. You will have preserved not only yourself but also elements of your culture for study and enjoyment by your own descendants.

Because your repository is digital, it can be copied and recopied and recopied, without ever degrading its original quality. Just as your children will pass a copy of "you" on to their children (your grandchildren), their children will pass a copy of you and their parents on down to their children, and so on and so on. You may get passed down for ... shall we say 10 generations? That's only 250 years, and we're trying to take the long view, for perhaps 1000 or 2000 years into the future. This means you may get passed down some 40 to 80 generations between now and then. Each succeeding generation of your descendants will have his or her own private copy of you, to explore as he or she wishes. Some will want to learn about the times you lived in perhaps, especially if one or more major events takes place during your lifetime; some may be curious

to learn what techno music was all about and to see if you left any Fatboy Slim or Chemical Brothers in your archives for them to listen to; some may in fact want to get to know you—personally, so they may want to drop in on you in your 3D virtual house, college dormitory, or office (all of which you have no doubt dutifully captured and preserved for them). For all these people, for all their varied interests and purposes, you will be available for study, exploration, and interaction, from now till the indefinite future. In essence, you will have reached a state of personal, cultural “digital immortality.” What are you waiting for?

15. Acknowledgements

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