

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

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Culture Preservation in the 21st Century, Karlsruhe, Germany

Clearly, Culture Preservation can be undertaken with many different goals.

- Historical
- Political
- Preservation (against extinction)
- Scientific
- Vanity
- Personal
- Financial
- ... and more

The goals are not always mutually agreeable.

They do not share the same technology opportunities / problems.

The persons responsible and the skills required are not the same.

Culture Preservation can be tackled at many levels:

↑
INDIVIDUALS
↓

- **World-wide**
 - for a given time (decade, situation, etc.)
- **National, regional, local**
 - Usually over longer periods of time
- **Ethnic**
 - Probably over very long periods of time
- **Group**
 - Corporations, Psychographic
- **Personal / Family**
 - Presently one or two generations, but moving toward longer time periods.

The Nature of Culture Preservation is Changing Significantly

- **It's getting Harder and Harder:**
 - Cultures are becoming far more dynamic, more complex
 - More people, with more levels & types of interaction
 - Increasing production of artifacts each year
 - Digital decay
 - Increasing rate of artifact production (perhaps exponential)
 - Increasing cross-cultural influences
 - Many more psychographic cultures
- **And, It's getting Easier and Easier:**
 - Ubiquitous, cheap computers, digital cameras, scanners, video players, etc.
 - Media management and creation software tools
 - Online Internet publishing and hyper-connectivity.
 - Cheap, small massive storage.
- **Perhaps most importantly, it is becoming highly “democratized”.**
 - Many more participants in the activities.
 - The culture contributors can also play significant roles as preservers.

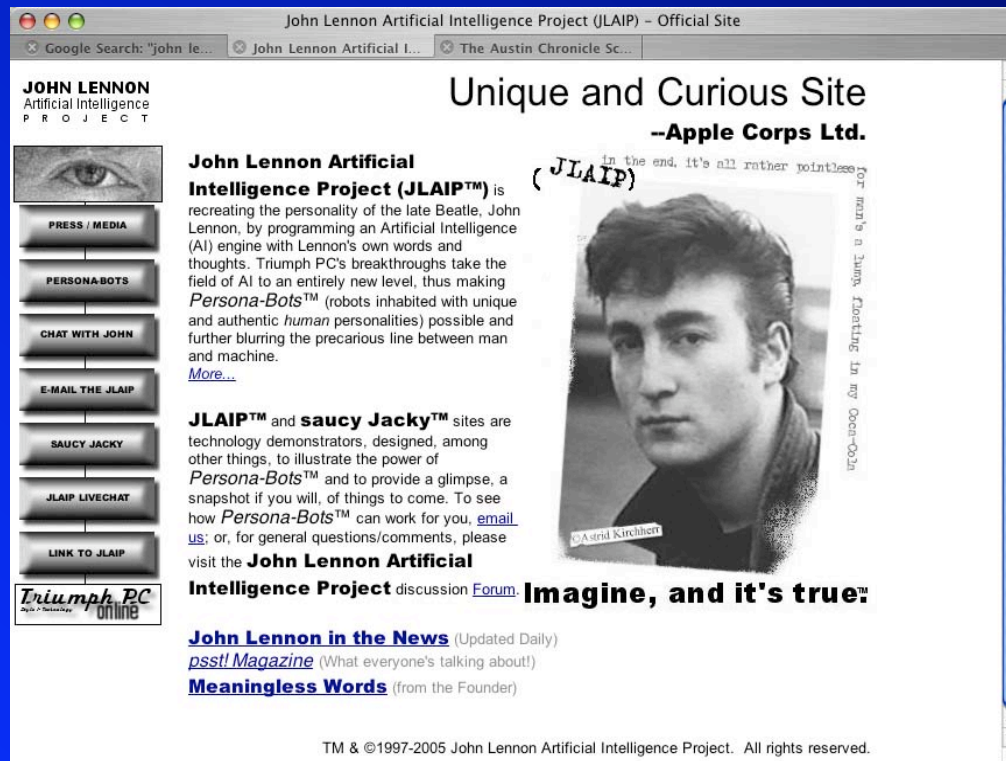
The Digital Age creates more and more cultural artifacts to preserve.



Clearly, many technology advancements will be needed to preserve them:

- Digital Information Collection techniques
- Self-organizing, dynamic repositories
- Culture-based Ontologies
- Time-relative context management schemes (key for dynamic cultural components).
- Much better Searching Technologies.

Consider the John Lennon AI Project:



There are NUMEROUS assets being collected to “recreate” an artificial John Lennon.

- Songs, lyrics, audio recordings
- Song notes, tablatures
- Auto-&Bio-graphies
- Critics’ comments
- Fan club mailings
- Business contracts
- Radio & TV interviews
- etc., etc.!

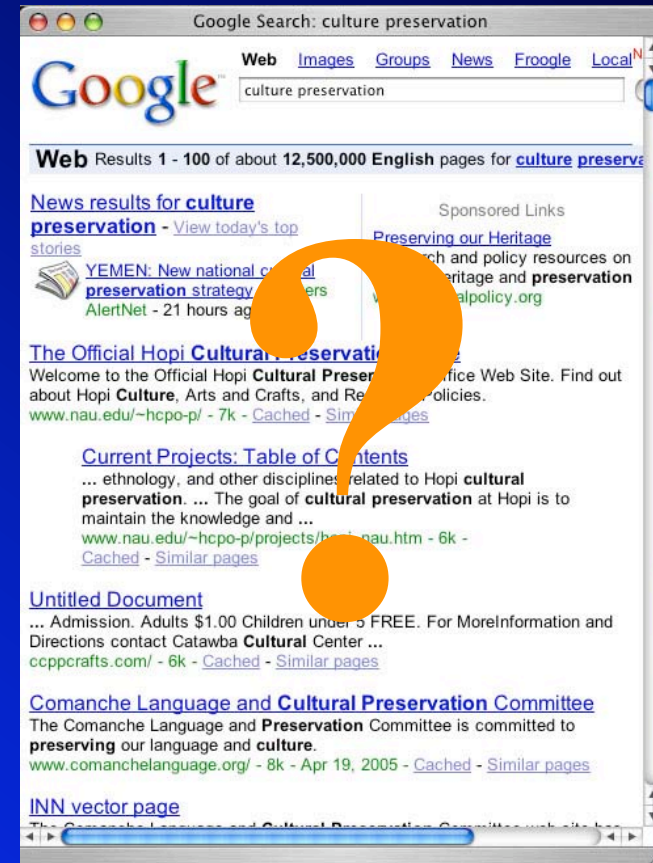
The eventual goal is to be able to talk directly to John Lennon, to ask him questions, to ask for information about him, to study him, and ultimately, even to “experience” John.

One key technology is this approach to Digital Immortality is colloquially called Chatterbot Technology.

Recording a Person's Life

- We are reaching the point where we can
 - affordably record and store every-thing a person does and creates
 - using video, audio, and other sensors
- DARPA's LifeLog Program
- Microsoft's CyberAll Research Program
 - (LifeBits, Digital Immortality)
- Some Related Web Site Programs are also underway:
 - www.123456789.net
 - www.legacy.com
 - www.forevernet-work.com
 - www.memorymountain.com
 - These web-based companies will store your letters, essays, photos, videos, and stories "forever"
 - in order to pass them on to future generations.
- These are the digital equivalents of
 - tombs, crypts, and (perhaps) libraries.

The information in these future repositories will be truly massive by today's standards.



- How will we want to / need to access and use this information?
- Far more importantly, how will future generations want to access and use this information?

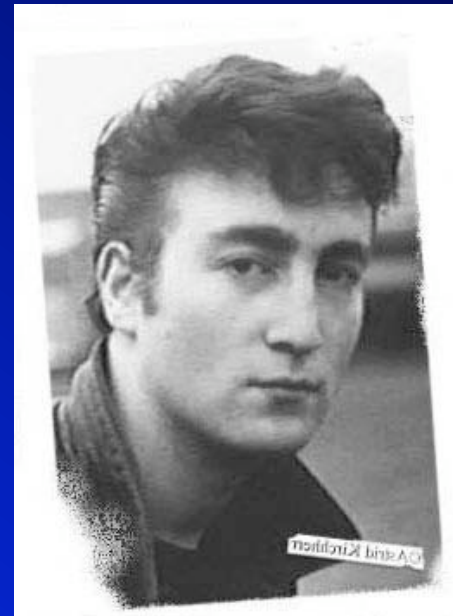
How about a cartoon-like, emotional, animated, conversational Agent or Avatar as the interface?



This is the proposed *futuristic* animated interface to “world knowledge” in the movie, A.I.

Is this who we want to talk to when asking questions about John Lennon?

Unarguably, most users—probably future users—would prefer John Lennon himself to be the interface!



Unfortunately, John is no longer with us.

This is where Digital Immortality could come in.

What is “Digital Immortality”?

- Very imprecise; means different things to different people.
- Usually, the term is used in an information-theoretic sense.
 - But there are more exciting aspects to it in the long term.
- *At the least contested level of definition, it is essentially:*
 - the *ongoing availability* of a complex data and information store
 - that is intended to be interacted with in complex manners
 - whose “organizational core” is a specific person or other entity
 - and whose contents are accessed through an intelligent interface.
- To date, the two most commonly addressed entities are:
 - Corporations
 - Persons (usually, animated agents “pretending” to be real people)

My focus will be mostly on “Personal” Digital Immortality.

Multiple Forms of Immortality are Being Pursued

Personal Digital Immortality

Roughly: A Personal Database is made of everything a person sees, hears, or says* all of a person's photographs, videos, audio recordings, documents, diaries, interviews, love letters, notes, papers, etc., etc. over a lifetime.

An **interactive agent / avatar** is placed in charge and (perhaps) equated with the collected "memories", events, and assets of the person, or even with the person him/herself.

Biological

Digital *

Fame

Religious

Uploading *

Genetic

Memetic

* Clearly, this includes: *creates, receives, etc.*

Many types of artifacts can be used in a Personal Digital Immortality effort.

- Digital Video & Audio
 - Digital photo cameras, video cameras, voice recorders, etc.
- Digital Photo Albums & Movies, Vanity DVDs, etc.
 - Autobiographical, voice annotatable, multiple media.
- Electronic Writing, Archiving, etc.
 - Emails, diaries, chat logs, ...
 - Love letters, personal notes, ...
 - E-Books and Papers collected, written.
- Personality Profiles, Emotion Maps, etc.
- And many, many more.

Clearly, one of the key goals will be capturing sufficient assets to create the “avatar” or “agent” that future generation users will see and talk to.

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So we will clearly need:

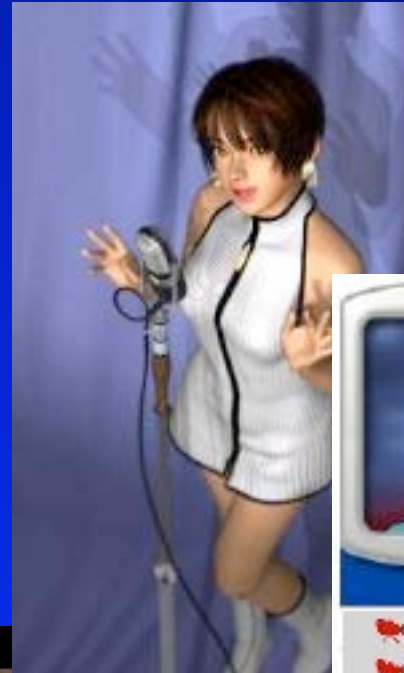
- Video
- Photos
- Voice

But we will also need:

- Personality Profiles
- Emotion Expressiveness
- Belief Systems
- Third-Person Perspectives

Obviously, for an avatar to be believable and satisfying, we will need to be able to create a “nice head” and “nice voice” that can readily be identified with the dead human.

We're getting extremely good at creating highly realistic artificial faces and animated virtual humans.



Hi. I'm Charles,
and I don't exist.



- These were all generated with computer graphics.
- Only one of them is based on a real human.

We can even create agents (talking heads) from the real faces of real people, using Video rather than 3D Graphics.

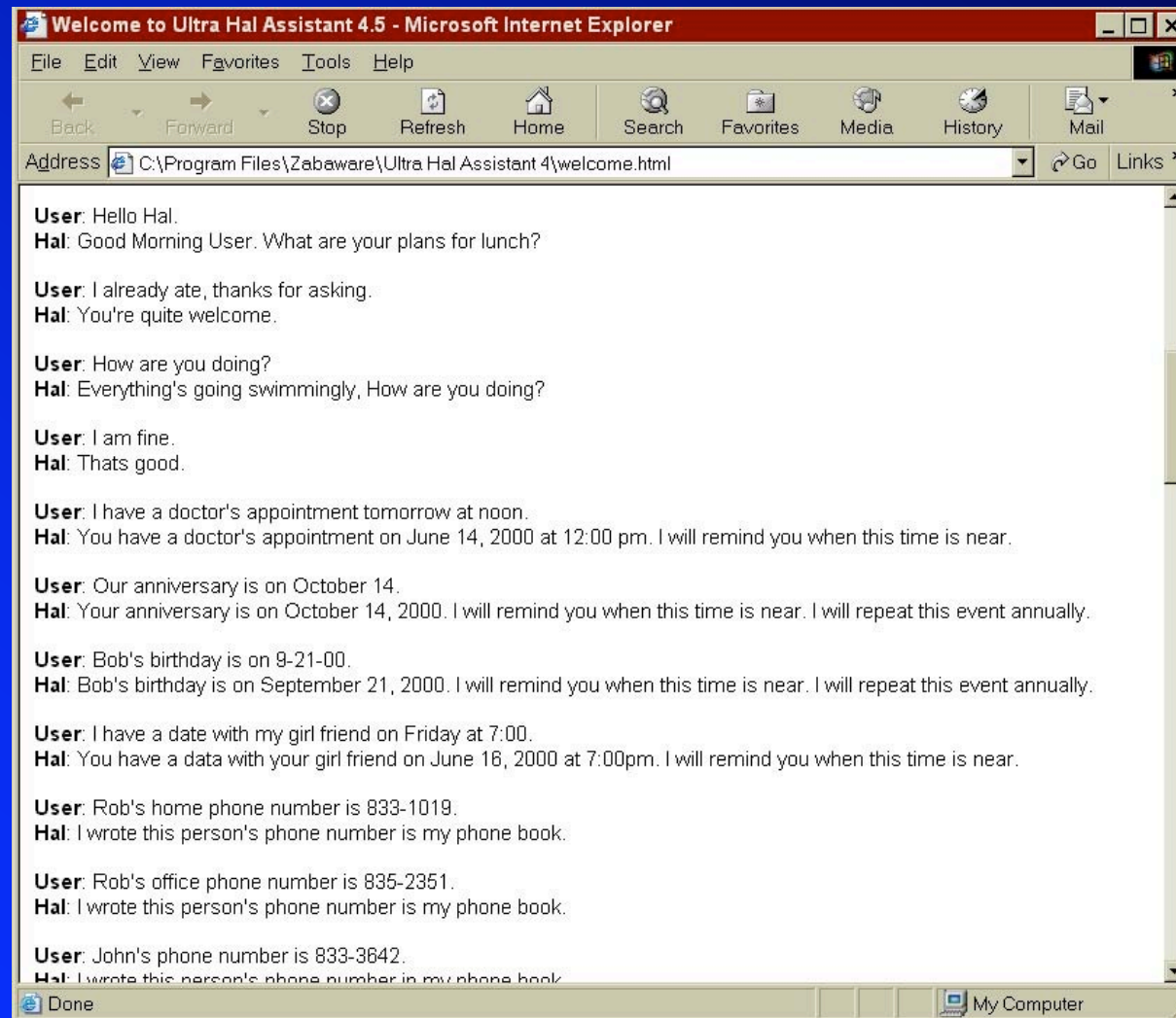


This talking head is based on video of a live subject.

There are no generated “graphics”.

However, much of the video has been “altered”.

We are also getting pretty good at making conversational agents.



Chatting with Shakespeare

by Sam Hummel and Johan van der Meulen

Shakespeare: Greetings. Take your place with me in discourse.

Sam: I will gladly.

Shakespeare: You lie, in faith, for you will gladly not!

Sam: How do you know!

Shakespeare: Examine every married lineament, and see how one another lends content, and what obscured in this fair volume lies, find written in another. That is how.

Sam: So you examined my lineament and knew that I was not glad?

Shakespeare: What I should think of this, I cannot tell you.

Sam: Tell me what you can think about.

Shakespeare: Thou blind fool, what dost thou to mine eyes that they behold and see not what they see? They know what I can think about is, but see not where it lies.

Sam: Why don't we start again.

Shakespeare: What! Answer upon compulsion? 'Zounds, I would not tell you on compulsion. Give you a reason on compulsion! If reasons were as plentiful as blackberries, I would give no man a reason upon compulsion.

Sam: I could not compel you to do a thing even if I wanted to.

Shakespeare: Well, now that I think on it, you could not compel I to do a thing even if you wanted to

Sam: I'm getting tired and think I will go to bed now.

Shakespeare: Why, then, you are getting tired and think you will go to bed now? Have you read my poetry?

Sam: Yes, I have read your poetry.

Shakespeare: Would you like to hear my latest poem?

Sam: yes, I would like to hear your poetry.

Creating Conversation

- Conversational Dialog Components can be created from artifacts of the human, including
 - Personal diaries
 - Email archives
 - Personal correspondence
 - Audio recordings (using speech-to-text conversion)
 - Etc.
- Converting these into truly satisfying, believable, and especially useful conversational dialog components is certainly non-trivial.
 - But we are making huge advances in all the required fields.

VideoBots compared to ChatterBots

ChatterBots

- Turing-Test “Cheaters”
- Text-Only interface
- goal: Make the user “feel” like they are talking to a human (not “believe”).
- Approach:
 - multiple “psychological” tricks
 - blame the user when confused
 - change the subject
 - express humor, embarrassment, etc.
 - “domain” specific
 - maintain conversation/goal “states”

VideoBots

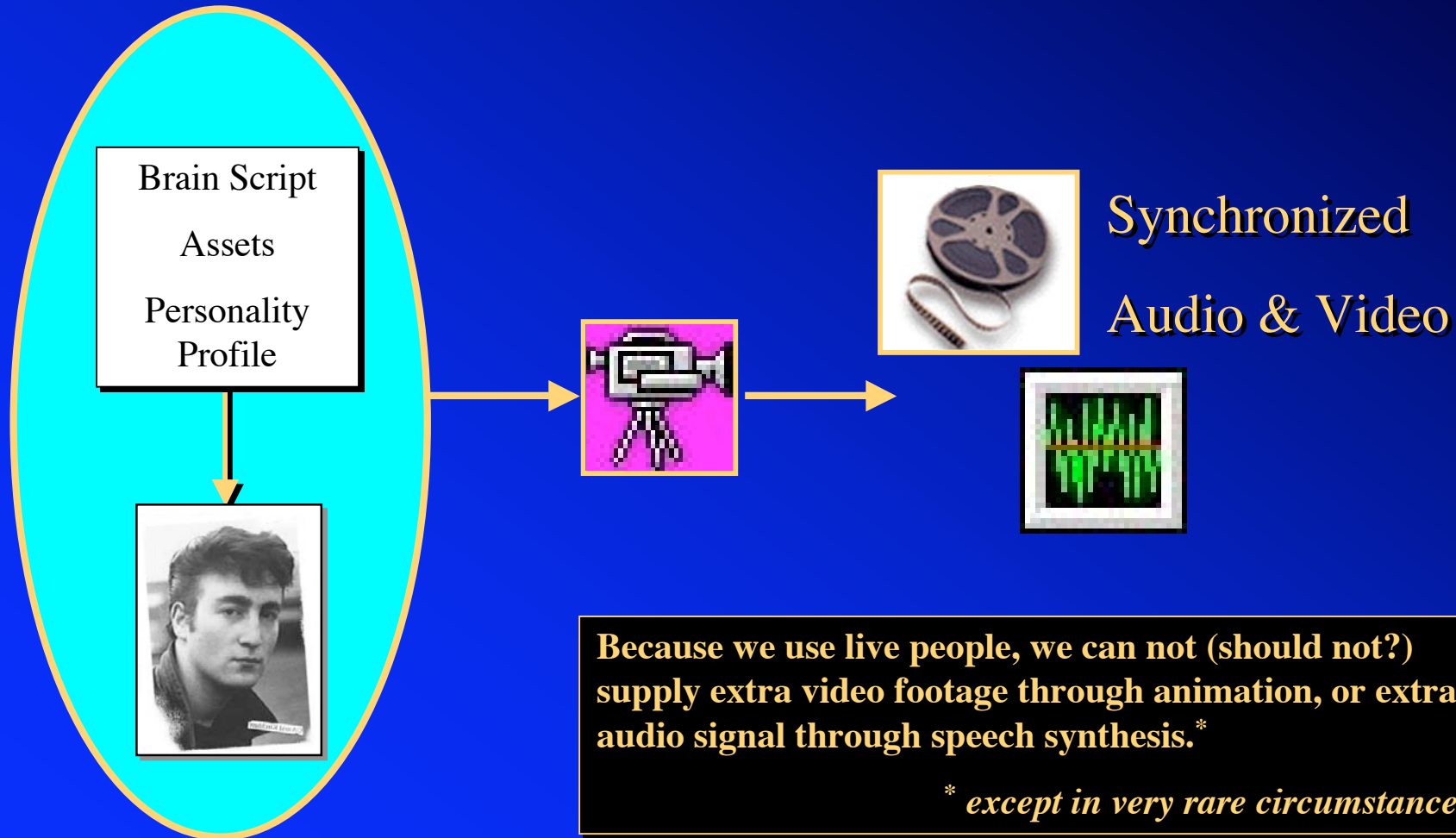
- full incorporation of ChatterBot technology
- Video, Speech, and Text interfaces
- provide “true human” interface(s)
- goal: Make the user “feel” like (not “believe”) they are talking to and SEEING a human .
- Achieve hands-free command & control.
- rely on “Suspension of Disbelief”
- Approach:
 - (all of the ChatterBot approaches, plus:)
 - pre-shot, canned video sequences
 - exhibit “human behavior” even when idle
 - interject “non-transferred” visual signals
 - (e.g., scratching one’s head, drumming one’s fingers, etc.)
 - Needs: text-to-speech; extra “tricks”

ChatterBots can use a set of well-known “tricks” to maintain the illusion of their “humanness.”

- Randomly change the subject.
- Use questions to get the user to talk about him/herself.
- Use the user’s statements to formulate replies.
- Admit ignorance.
- Rigidly continue the previous topic.
- Use humor, controversy, insults, etc.
- Excerpt USENET news stories.
- Simulate human typing errors.
- Utilize “stories” to maintain continuity of dialog.

These will NOT prove useful or welcome in Culture Preservation applications of Digital Immortality.

The Production Process of “Natural Digital Immortality” prioritizes the use of actual, filmed sequences. This is highly suited to the tasks of Culture Preservation.

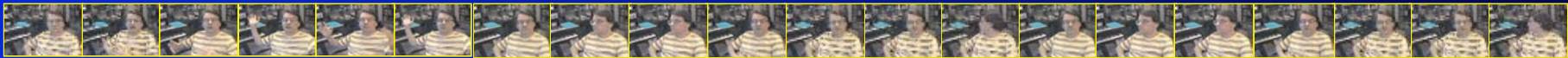


We can get talking heads to do and say things their human-counterparts never did.

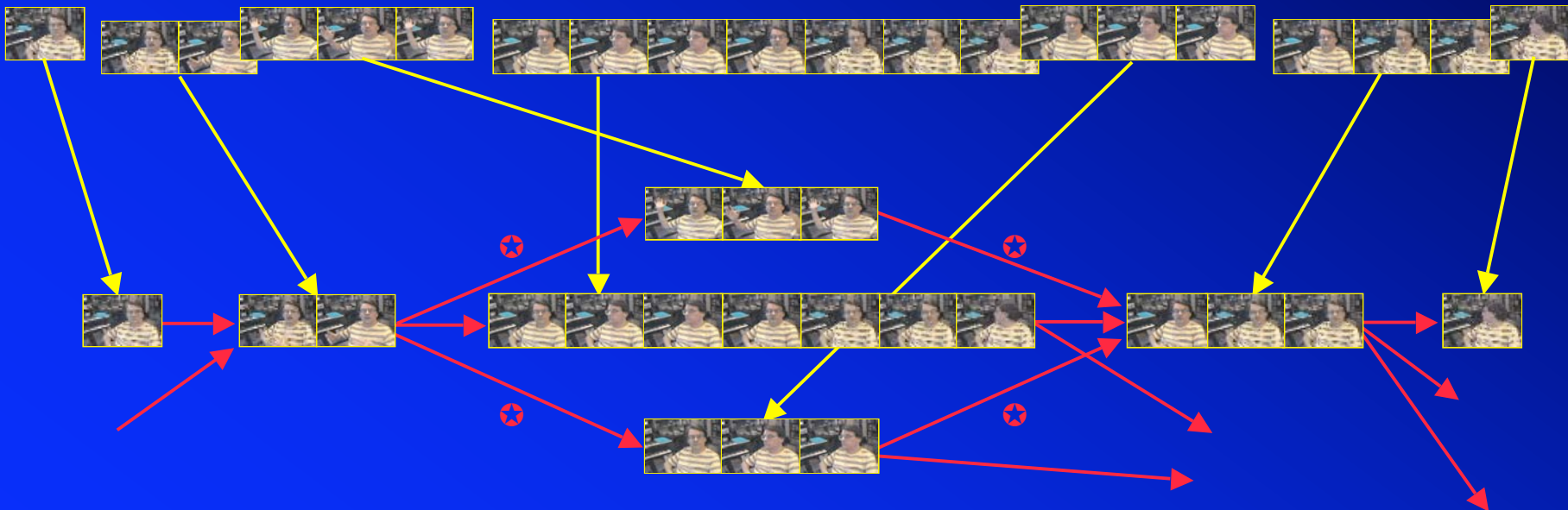
- This can be for good or for bad.
- For true Digital Immortality applications, we would presume that the goals include
 - Making the sayings and behaviors “consistent” with the human
 - Minimizing the use of this
- Legitimate Purposes:
 - For some speech the person made, we have only the audio but not the video. “Manufacturing the video to go along with the audio would presumably not violate too many people’s ethical standards.
 - We can have the avatar “read” a letter or document the human wrote, using consistent audio (“voice cloning” techniques, for example).

Linear to Random Video

1. The video is captured normally – in scripted, linear sequences

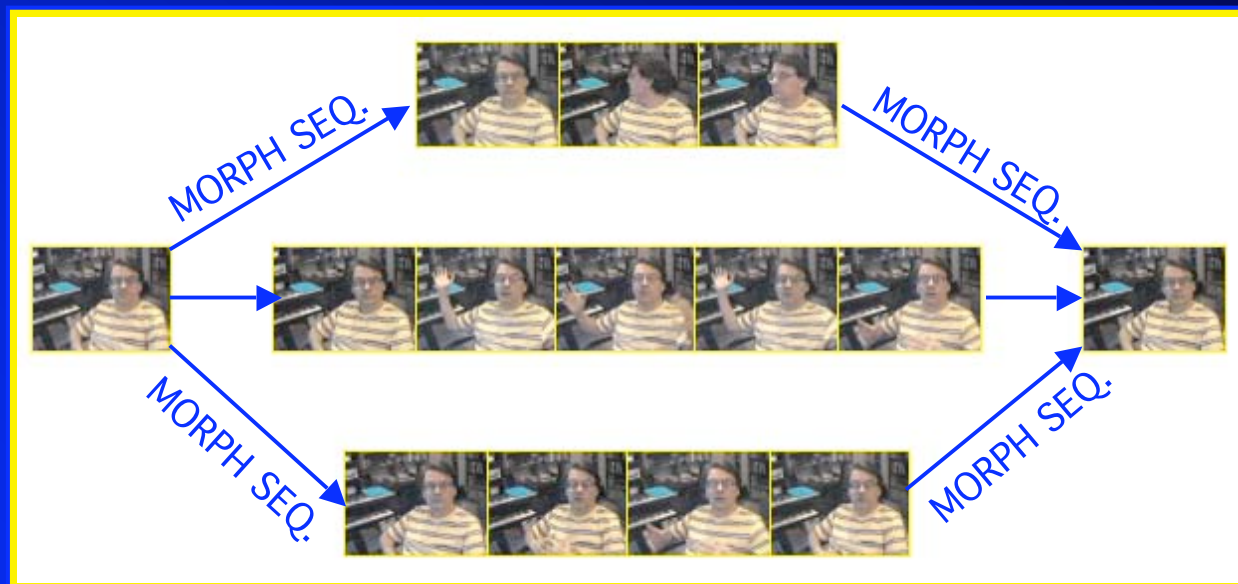


2. Break points are chosen / identified.



3. Morphing “joins” (✱) allow segments to be replayed in alternate sequences.

Providing Pseudo-Realistic Responses:



- There must be multiple responses to every query or instruction.
- These must be replayed randomly.
- All video sequences must begin & end “identically”.
- Morphing tools are required to make the frame transitions seamless.

Constructing Complex Sequences of Behavior



So, Skipping past a whole bunch of technical details and examples, ...

- We're getting very near the point of being able to create talking heads that
 - Look like
 - Sound like
 - Act like
 - Think like (or, "pretend" to think like)
 - Emote like
- A real human.
- Even a specific real human.

Examples of “Next-Generation”, Artificial Personality VideoBots

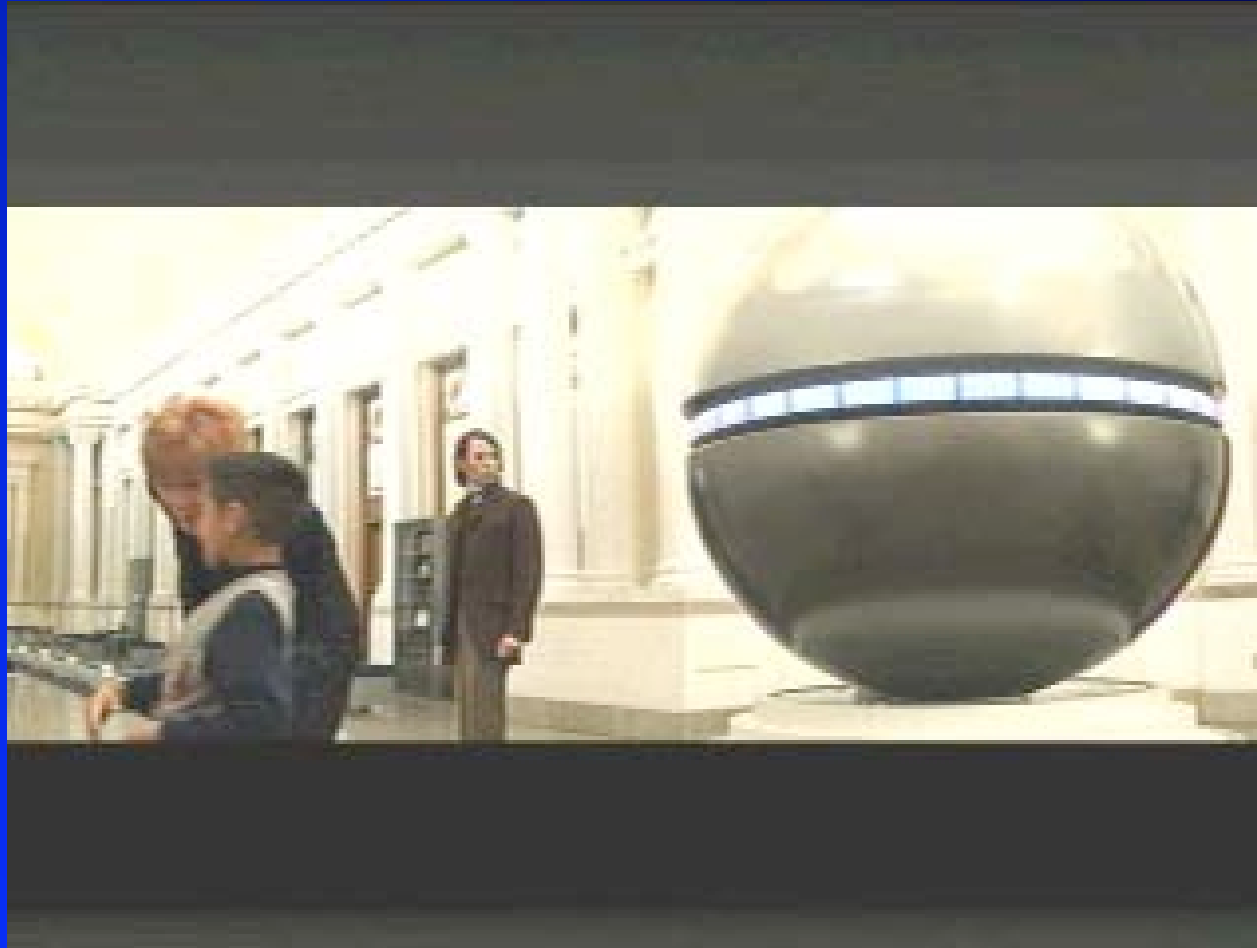


Hank and his girlfriend (in *The Sixth Day*).



The Fifth Avenue Public Library’s informational kiosk: a VOX – registration NY-114.

Examples of “Next-Generation”, Artificial Personality VideoBots



The Fifth Avenue Public Library's informational kiosk: a VOX – registration NY-114.

So, Skipping past a whole bunch *more* technical details and examples, ...

- Q: What would happen if we reached the point where persons interacting with the Talking Head could truly not tell the difference?
 - And perhaps they don't need to, or even want to?
- There are potentially huge legal and ethical ramifications to be dealt with.
- Culture Preservers may help bring this state about, whether purposefully or accidentally.
- But is this far-fetched?

Moore's Law – The 40th Anniversary Was Just This Week

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Moore's Law on chips marks 40th

Moore's Law, the guiding principle that has driven the computer chip industry, celebrates its 40th birthday this week.

The "law" was adopted after Intel co-founder Gordon Moore wrote in a 1965 article that the number of transistors on a chip would double every 24 months.



Better chip performance has driven the digital revolution.

Chips that can work faster and faster have driven the technological and digital revolution so far.

Dr Moore said that the next 40 years could be "mind-boggling" and that he wished he could be around to see it.

"I re-read my 1965 article a year or so ago, and I frankly was surprised to see in it that I had predicted home computers as one of these uses for low-cost electronics, but had no idea what it would look like," he told the BBC News website.

He had forgotten about it until a young engineer came to him with the idea to build a home computer, while he was chief at Intel.

"I said 'gee that's fine but what would you use it for?'.
"The only application he could think of for it was the housewife putting her recipes on it, and I didn't think that was going to be a powerful enough application."

"I frankly didn't expect it to be at all precise. But in fact it turned out to be much more precise than it had any good reason for being, and a colleague dubbed it 'Moore's Law'"
Gordon Moore, Intel co-founder

Read about the impact of Moore's Law

FUTURE OF COMPUTING

KEY STORIES

Digital law
Moore's Law has pushed the digital revolution

- Moore's Law on chips marks 40th
- Intel reveals Wimax wireless chip
- Supercomputing power made real
- Longer life ahead for laptops
- Cheaper chip for mobiles
- IBM hails nano chip-making
- Nanotech takes aim at transistors
- Super-fast future for computing
- Computer chips pushed to edge
- Promise of intelligent networks
- Visions of future PCs

FROM OTHER NEWS SITES:

- South Bend Tribune Article increases value of magazine - 38 hrs ago
- MSNBC Wanted: Original copy of 'Moore's Law' - 40 hrs ago
- Sydney Morning Herald* Wanted: original copy of 'Moore's Law' - 54 hrs ago
- Tampa Tribune Intel Founder Saw Future In Chips - 71 hrs ago
- Kentucky.com Why steal a 40-year-old Electronics magazine? - 17 Apr 2005
- About these results
- * Requires registration

The BBC is not responsible for the content of external internet sites

RELATED INTERNET LINKS:
Moore's Law

Evolution of Computer Power/Cost

MIPS per \$1000 (1998 Dollars)

Million

1000

1

1
1000

1
Million

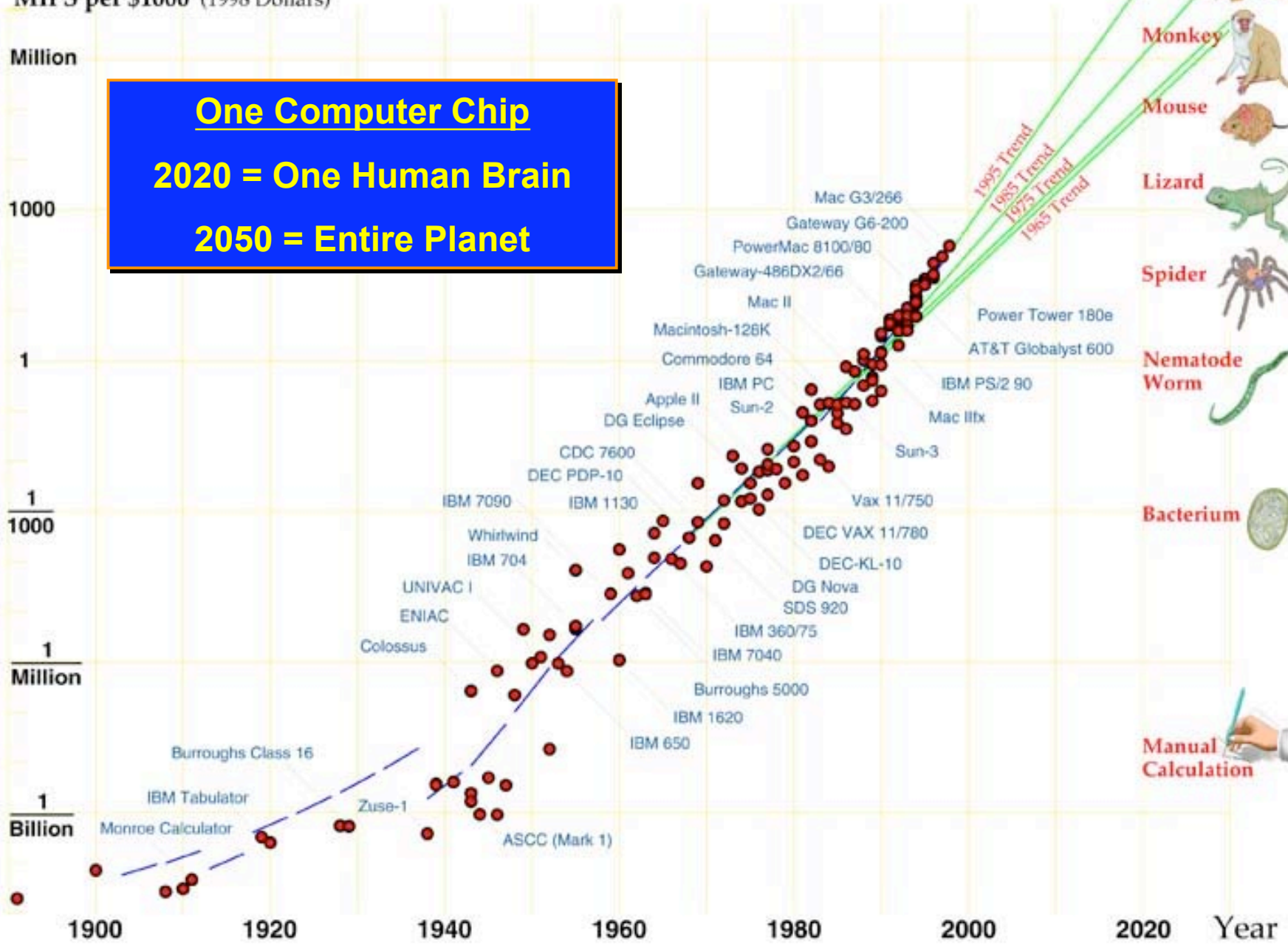
1
Billion

1900 1920 1940 1960 1980 2000 2020 Year

**One Computer Chip
2020 = One Human Brain
2050 = Entire Planet**

Brain Power Equivalent per \$1000 of Computer

- Human 
- Monkey 
- Mouse 
- Lizard 
- Spider 
- Nematode Worm 
- Bacterium 
- Manual Calculation 



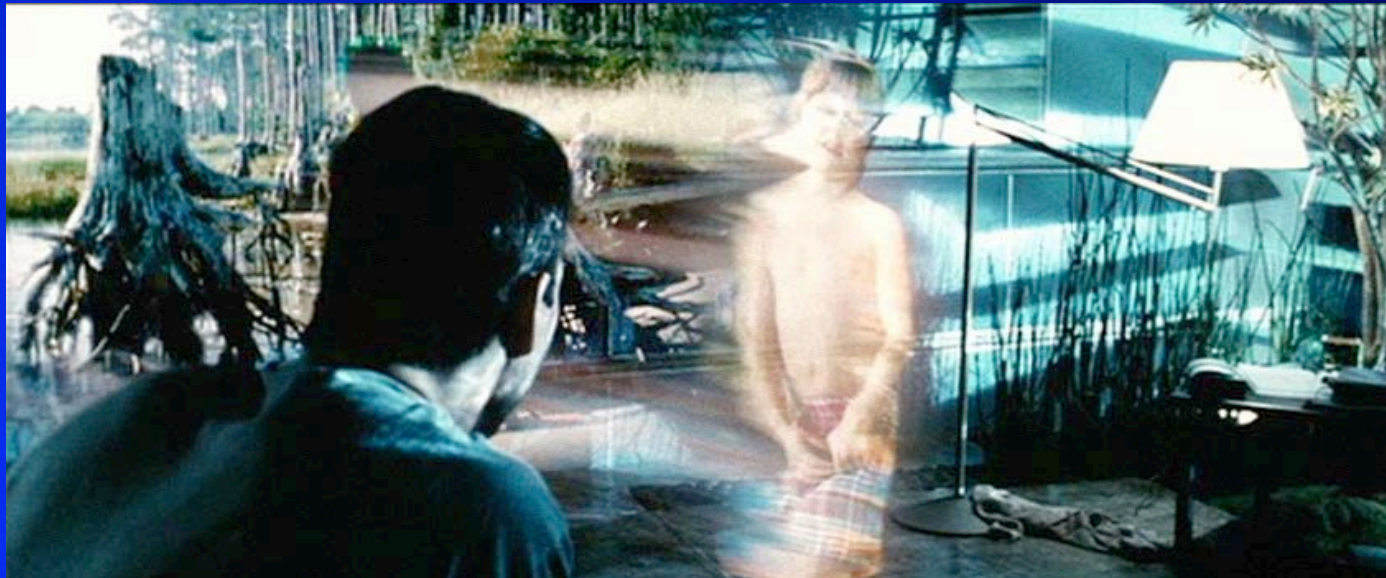
LIFE BITS: A Microsoft Research Labs Project

“ We believe with Ray Kurzweil, Hans Moravec, and others, that it is likely there will be more and more faithful avatars over the next century. By 2040, Moravec predicts that robots will be as smart as humans. Successive generations of **question-answering avatars** will gradually become indistinguishable from the actual persons we know and love in 2001, **enabling that person to appear to ‘live forever’**. ”

Gordon Bell & Jim Gray, MSR

Visiting & Experiencing the Past With Digital Immortality

One of the grand hopes for DI is that asset preservation of the right kind, coupled with emerging technologies, will allow for interactions that in a very strong sense seem “real”.



John visits and talks to his dead son, Sean.

Many significant DI insights can be gleaned from this segment of the film.
I urge you to watch it and think about it long and hard.

Minority Report, Philip K. Dick

Visiting & Experiencing the Past With Digital Immortality



John visits and talks to his dead son, Sean.

Visiting & Experiencing the Past With Digital Immortality



John visits and talks to his dead son, Sean.

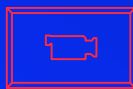
I want to strongly argue that Culture Preservationists:

- Must recognize that “The future ain’t what it used to be, by a long shot.”
- Must participate in predicting and understanding the various new ways that today’s assets will be used by those who inhabit tomorrow.

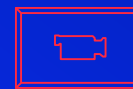
(cf. *The Art of the Long View*, by Peter Schwatz)

- Take the lead in the redefinition of asset-structure and meta-architecture.

Even Superman forgets that his father is only a VideoBot.



Fortress

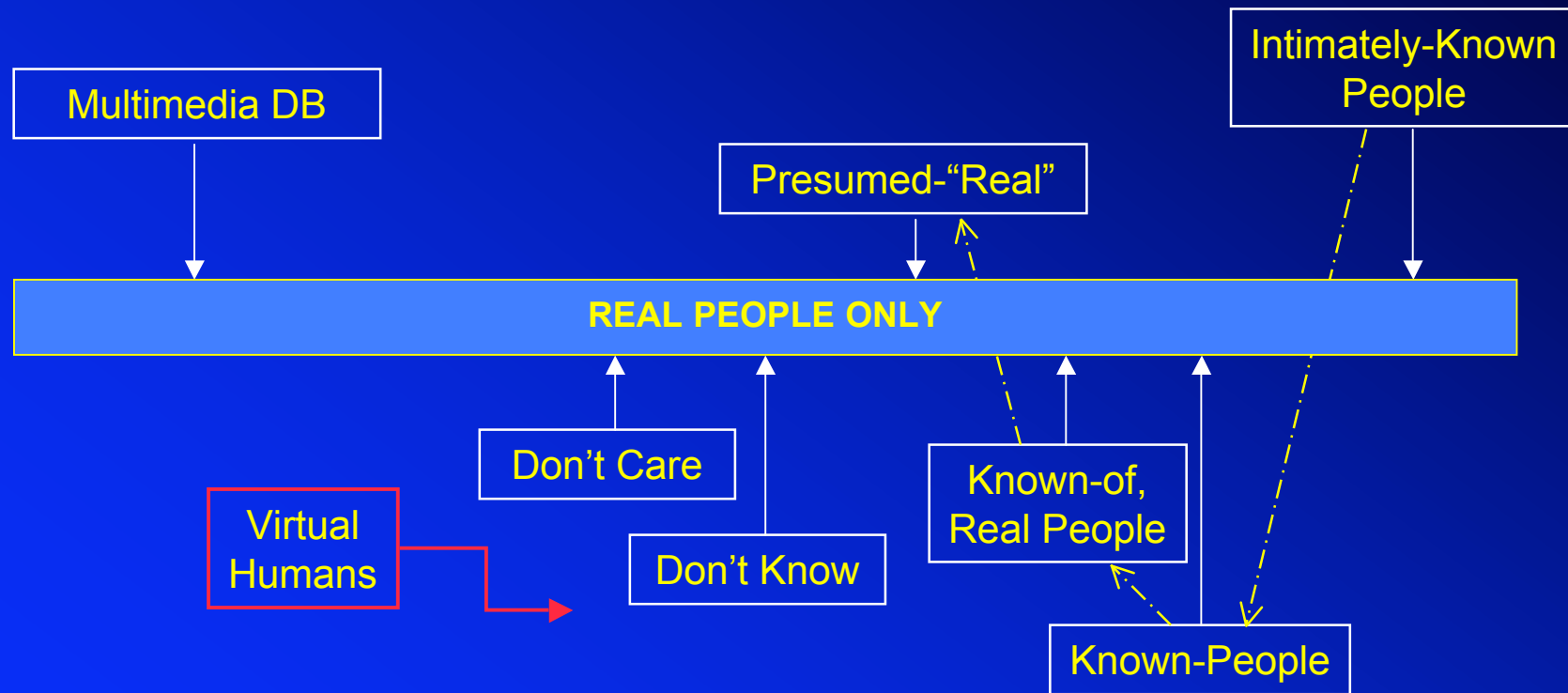


Advice

Even Superman forgets that his father is only a VideoBot.



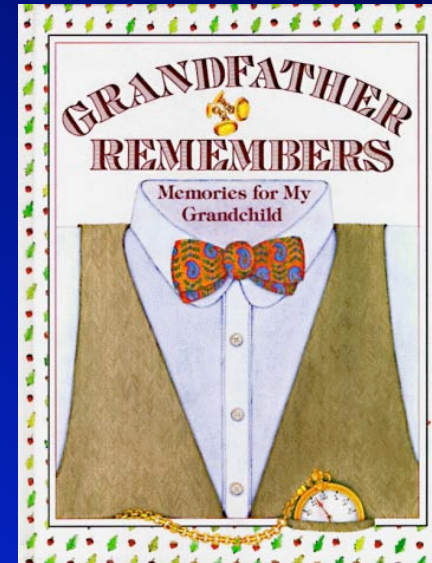
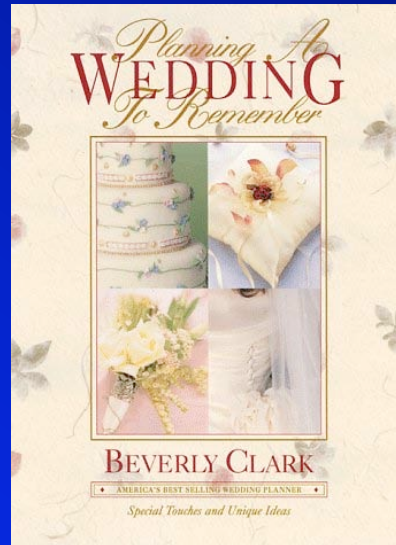
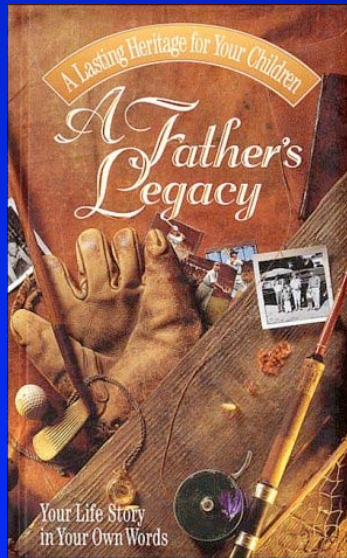
The Digital Immortality Continuum's Relevance to Culture Preservation:



Note: many of these classifications change over multiple lifetimes.

Things are surely much more complicated than this.

Want to start preparing for Digital Immortality yourself?

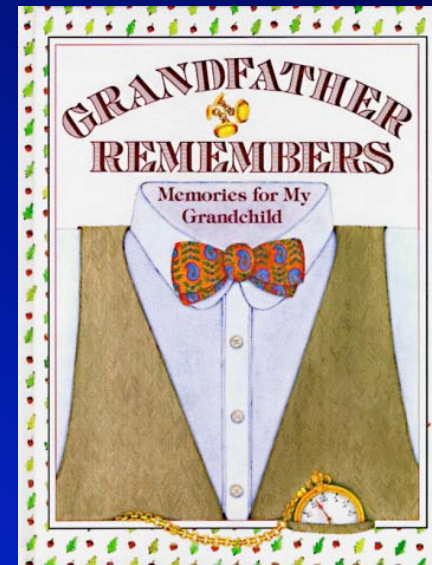
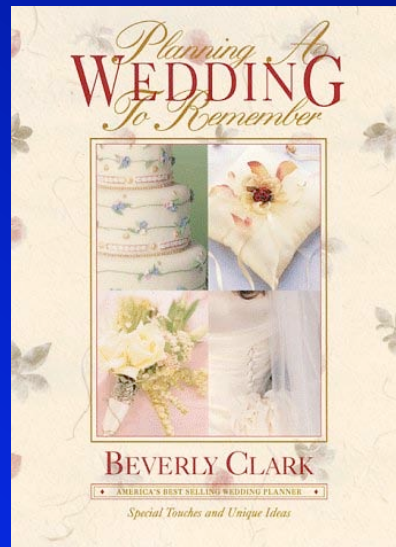
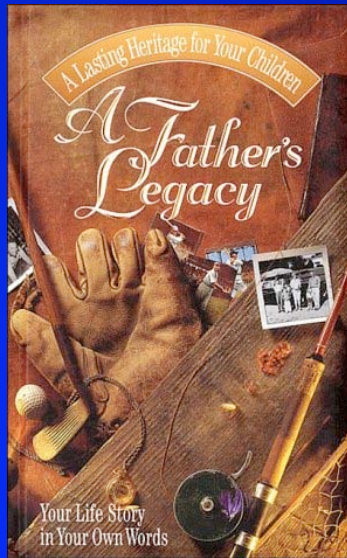


We already have many “kits” for recording our personal lives.

... and for other people's use, not our own!

Want to start preparing for Digital Immortality yourself?

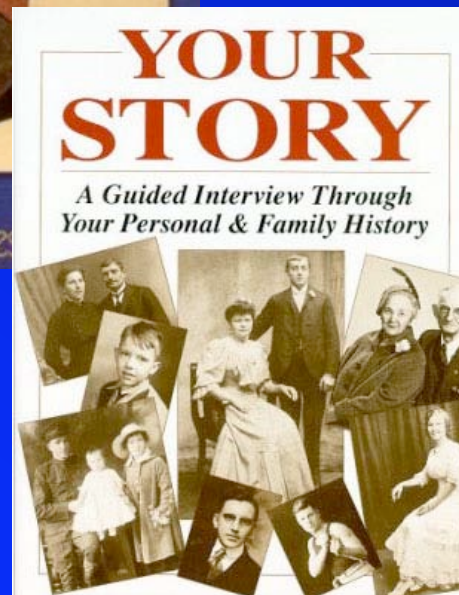
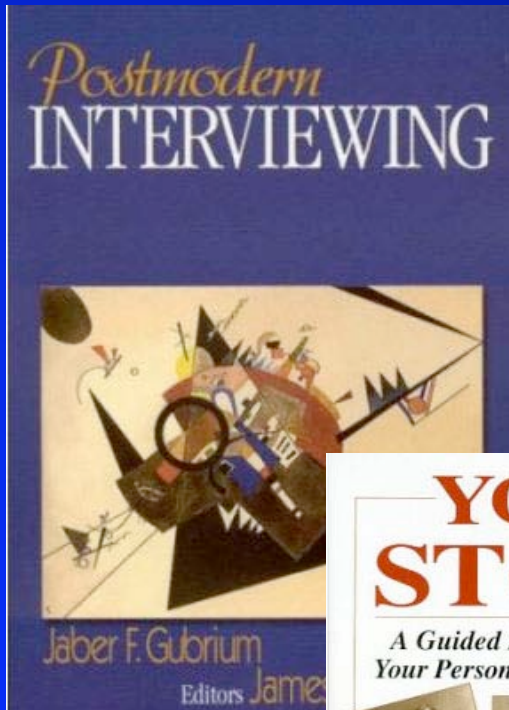
... and for other people's use, not our own!



What sort of “kits” can help at proactive Culture Preservation for producing interactive “people” using Digital Immortality techniques?

How should interviewing, reporting, and videography change?

Changing the Collection Process



- What sort of “kits” can help proactive asset collection for use in Culture Preservation activities that can be used for producing interactive “people”?
- How should interviewing, reporting, and videography change?
- What can we get the subjects themselves to do to assist in the process?

Some Conclusions:

- Culture Preservation has some significantly different goals and emphases than most other work in animated, conversational agents.
 - It must help shape and define the technology agenda of the IT community.
- Clearly, “real” or “natural” assets will prove preferable.
 - Actual video footage, actual audio recordings, real photos, etc.
 - Real quotes and emotions vs artificial emotions and random quotes.
 - But we need them in more forms and in different forms than is common today.
- Culture Preservation participants
 - must anticipate the use of its assets, in new and emerging technological ways
 - should be proactive about collecting and creating the right sorts of assets for these new technologies.
 - Must accept that the assets they help preserve will be used to create “Virtual Humans”.
- They may in fact need to take the technological lead in DI, rather than the commercial sector. This is a unique opportunity for Culture Preservation.

The End

Thank you very much for your attention and interest.

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