

TO: Post-DL Workshop Participants

FR: Jerry Goldman, Northwestern University

SU: "The future ain't what it used to be"

DT: 30 May 2003

I have decided to approach this writing assignment in an informal fashion. It makes the task simpler for me. To those of you who may find this approach off-putting, please accept my apologies. Consider this statement a down payment. I reserve the right to withdraw everything I say here though I confess that these ideas require much more elaboration than I am offering at the moment.

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We will soon arrive at the point where we are capable of downloading all the knowledge of humankind to the desktop or of finding it on a network. But knowledge of everything does not lead to wisdom in anything unless we can provide the means to move from knowledge to wisdom. This requires, at minimum, the ability to locate relevant information.

PROBLEM 1: HOW WILL WE FIND INFORMATION? Today, this task usually involves a variant of a text search within or across databases. The modal information seeker with access to the network is likely to look to Google for assistance. But the results of such searches – even well refined text searches – often result in more responses than the searcher can grasp. Experiments are underway to engage in searches that rely on different modalities (e.g., searching by shape or color; search by "sounds like..."). Still, this is not sufficient to the problem presented by access to all the knowledge of humankind.

The main challenge, at least to me, is simply envisioning information. Visualizing quantitative data has long been a creative solution to information overload. The problem of visualizing information becomes challenging when we add text, audio and video content to the information pool. So one key objective is to explore new ways (or old ways in new data environments) to visualize media-rich information. The principal evidence that visualization of information works lies in our genetic development. We perceive much more when we can picture abstractions. So as human beings, we know that information visualization and exploration will summarize content and provide the means to display it in new and perhaps novel ways. Coupling visualization with different data types (audio and video, for example) may require invocation of additional sensory information. Sound comes to mind; I'm less certain about taste, touch and smell. Perhaps there are ways to invoke our own human 'engineering' to make the quest for information more efficient.

I can imagine an information room where users can specify an initial domain (American domestic politics, 1964) and 'walk through' this information space. In one domain there will be audio; in another domain, video. Perhaps users are interested in particular individuals or events. The space would be reconfigured to provide access to all public data associated with them. Through a process of sampling and refining subsequent text searches, users will locate what they seek and, perhaps, discover additional information that bears on their interests as seen through the prism of the visualized or sensed world.

Apart from experiments in data visualization, which will surely lead to improvements in comprehending enormous data sets, there is little beyond my imagining that gives me confidence that we can actually create methodologies to search visually (or by means of other senses) across data types. But it strikes me that research in the visualization field is worth some investment if only to approach an old problem ("finding stuff") from a different and inherently appealing direction. My hunch is that such an approach may take ten years, perhaps more. I haven't a clue what it will cost.

PROBLEM 2: HOW DO WE ENCOURAGE THE SHARING OF INFORMATION WHEN INTELLECTUAL PROPERTY RULES CONSTRAIN SUCH ACTIVITY? In a world where we have access to all the knowledge of humankind, the price of information will approach zero. Information will not be prized for its own sake. The limiting resource will be human attention. So we need to focus on ways to minimize the attention we give to finding the information we want, or think we want, and to do so in a manner that also permits and encourages departures along information paths that may encourage the creativity that transforms information into something new and perhaps into knowledge.

The current copyright regime lurks beneath so much of the information we create in the United States. Today, everything we create is protected by copyright at the moment of its birth. Every creator is a rights holder. And, given the persistent and odious threat of legal challenges to rights violators, information gatekeepers may be loath to share information when rights have not been cleared. Most of this information is simply the result of a creative enterprise with no expectation of copyright assertion. Still, under the rules now in place, clearing rights will be essential if we want to use any of this information or create derivative works for them. Congress's effort to project Mickey Mouse has renders information providers will little or no leeway in the development of a rich information commons. Unless we find ways around this constraint, we run the risk that the gatekeepers will over-police the commons resulting in far less information and far less derivation of new knowledge.

The Creative Commons has taken a new look at ways to grow the commons, the content that serves as the basis for creative enterprise. And scholars such as Larry Lessig have made a compelling case that we need to encourage

wider uses of data lest we fall prey to a regime in which private content providers control the rules by which content users access and deploy information. Perhaps the idea of public use for non-commercial purposes for all information created by or managed with federal government resources should be the rule. Share-and-share alike licensing will place into the digital commons more information and their derivative works. Understanding the currents of the mighty ocean of information will enable us to avoid potential hazards. And perhaps we will manage to master the currents and navigate successfully to an information-rich future. But this outcome is only wishful thinking unless we take steps now to insure open access tomorrow.

This problem can be approached in many different ways. It may make sense to create an insurance pool to give risk-averse information gatekeepers some confidence and protection when they cannot clear rights or when the cost of rights clearance grinds release to a halt. It may also make sense to encourage novel licensing agreements for information creators. But it seems to me that we cannot ignore this issue hoping that it will disappear or solve itself. The cost of such an effort is very small in relation to the larger enterprise we are here to sketch. I believe we could propose, debate and adopt a set of information-sharing policies within 3 years. Doing nothing means that a few corporate information providers will determine the rules and practices for the rest of us. A successful outcome will assure a rich information commons and encourage derivative works, which form the basis of so much of our intellectual and cultural heritage.

PROBLEM 3: "YOU CAN HEAR A LOT BY LISTENING" This is an opportunity for me to raise consciousness regarding spoken-word resources. The US-EU working group on spoken-word archiving estimated about 100 million hours of analog spoken-word holdings worldwide. Additionally, tens of millions of hours come into existence each year in digital form. The cost of digitizing and storing this information is declining rapidly and there will come a time when all spoken data will be available in digital form. We can expect advancements in speech-to-text and summarization technologies to provide improved text-based searching strategies for spoken-word materials.

Human speech contains much more information than the words spoken. Research to identify prosodic elements (pitch, intonation) can help us map the emotive character of speech (anger, irony, happiness) and provide a novel way to aid us in finding the bits we want. These prosodic features may also provide clues to speaker intention. Our task will not be complete when the word-error rate approaches zero, though it will carry us some distance to this worthy objective. Machine-based prosodic identification and searching will open new avenues of research in the communication and social sciences. There are clear national security benefits as well.

Since speech prosody research is now underway in the US and abroad, I expect that within five years, we can render judgment whether this direction bears further investment. But again, I haven't a clue as to what it would cost

since I do not have any estimate of the investment to date. And as the great sage, Yogi Berra, might have said: "In the cyberstructure information ether, you don't know anything."

(Revisions to follow.)

JG: 2003-05-30