

The New Sensemakers

The Next Thing Beyond Search Is Sensemaking

by Mark Stefik

To understand relevant parts of our world, everyone does sensemaking. Not all sensemaking is equal. Here are some examples of sensemaking ranging from the mundane to the challenging:

- Someone looking on the web to replicate Grandma's recipe for Hungarian nut rolls.
- A high school student writing a report on the ecological effects of land clearing in the rain forest.
- A law firm wading through an inflated collection of documents delivered in the discovery phase of litigation.
- Collaborative sensemaking by intelligence analysts trying to understand some unusual message traffic between suspected terrorists, who may be planning an attack.
- A company searching through and organizing contracts, e-mail, and databases to have Sarbanes-Oxley compliance.

Sensemaking can be difficult and time-consuming. The difficulties and technological leverage points have little to do with the old-fashioned "info-glut" arguments about how many new sites or pages appeared recently on the web. Computers will play powerful roles in the process, but understanding the technological challenges and opportunities requires sophistication.

Over the last few weeks there has been buzz in the press about Google for the desktop. A colleague of mine loaded and tried the software. After using it for awhile, he said "The indexing is fast, but the interface sucks. It just brings the hit list of a web search interface to my desktop. I still can't make sense of what I have." This comment is representative of a general truth about developing technology for sensemaking. Companies whose inventive repertoire is bounded by key word search and clustering are ill-equipped to lead the charge.

Sensemaking systems don't only help people find stuff faster. That's just the information retrieval part. The bigger story is about augmenting and amplifying our abilities to make sense. Sensemaking adds things like skimming, power reading, organizing, spotting patterns, tracing social networks, taking notes, summarizing, drilling for details, and

flagging biases. Reading an article is different from reading a book, and that's different from reading from a collection or stream. Radically new forms of human-information interaction are being enabled by these new technologies. Sensemaking systems not only have front ends (visualization), but also back ends (content analytics and reasoning).

Herb Simon, the late economist and Nobel laureate, used to insist that attention is the scarce resource. An abundance of information yields a poverty of attention. The scientific edge today in understanding sensemaking is cognitive task analysis. Cognitive task analysis refers to analytic techniques for understanding the cognitive and perceptual activities of information work. Knowing what's hard and where sensemakers spend their time tells us where augmentation matters. From studies that range from eye-tracking to fieldwork, we learn the microstructure of human-information interaction. The timescales range from milliseconds for perceptual actions to hours for cognitive actions. Peter Pirolli, Stu Card and their colleagues at the Palo Alto Research Center have extended the analysis from information foraging (the information retrieval part) to sensemaking (how people organize and use information).

In his keynote address to the Information Visualization conference in October, Stu Card congratulated those assembled on the tenth anniversary of the conference. What he said next shocked many. "We set out to understand and develop new ways to visualize information. To a large extent we have succeeded. It's time to declare victory and move on to something else. The next big thing is sensemaking."

The eyes are the fastest information road to the brain. To get good performance across the human-information interface we need to understand subtleties of perception. Small displays, such as those on phones and PDA's are good for mobile applications and small sensemaking tasks. You can do bigger tasks with bigger displays on laptops and tablet PC's. For more complex sensemaking tasks you can use wrap-around collections of displays, the so-called "broadband" displays like those being experimented with at PARC. Imagine reading and organizing a stack of marked-up papers on a spacious dining room table. Now imagine trying to do this on a tiny airline tray table. Size matters. So does a semantic pipeline of language and knowledge technologies that can recognize meaning, detect patterns, and extract facts.

When my oldest kids entered middle school in the early 90's, the message from school was that calculators would not be permitted. They would destroy Johnny's or Jane's ability to do arithmetic. When my youngest went to middle school two years later, the attitude had changed. The school specified which manufacturer and model of calculator would be sold at the school and taught in the math class.

When I think about the new sensemaking tools that are being built at PARC, I imagine kids in middle school bringing home a note to their parents saying that Johnny and Jane will not be allowed to use their Sensemakers in school because they might destroy their ability to understand and organize information. In a couple of years, the school will specify the PARC Sensemakers, as the ones that will be sold in the school stores and taught in their classes.

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Mark Stefik is an inventor at PARC where he directs the Information Sciences and Technologies Laboratory. His new book (with co-author and wife, Barbara Stefik) was published in October by the MIT Press. It is called, "Breakthrough: Stories and Strategies for Radical Innovation."