



Today's information environments have become massive, complex, and diverse. Consequently, decision-making has become much more difficult and time-consuming. "Making sense" of these information environments requires integrating content:

- from any source (books, e-mails, newspapers, databases, reports, documents, websites, blogs, podcasts, videos);
- at any location (online or offline, networked or local);
- and in any form (unstructured or structured, digital or analog, in multiple languages).

### **The Challenge**

Sensemaking ("making sense" of information) involves multiple tasks, often handled by different individuals working together. These tasks include:

- searching, filtering, and extracting relevant content;
- rapidly reading and absorbing meaning;
- "connecting the dots" or detecting relationships;
- digging deeper and uncovering hidden patterns;
- gathering appropriate evidence and summarizing results;
- and efficiently organizing and presenting information.

However, current keyword-search and data-mining methods simply cannot meet these needs.

### **PARC's Solution**

PARC's approach to sensemaking combines language analysis and text mining technologies on the back end, with user-interface and information visualization technologies on the front end. Also involved are intelligent document recognition research that takes advantage of visual structure in document images, and security research that redacts mined content when necessary.

Together these technologies help people efficiently yet deeply integrate, organize, analyze, and display massive and diverse information.

The result: dynamic, user-sensitive, semi-automated technologies that enable deeper understanding, better decision-making, improved communication and collaboration, and greater productivity

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## Application Areas

### Sensemaking for Business Intelligence and Financial Analysis

- combined structured and unstructured content analysis
- automated content tagging and metadata generation
- integrated offline + online research
- enhanced customer-relationship management (CRM) tools
- forensic accounting and compliance monitoring (e.g., Sarbanes-Oxley)

### Sensemaking for Search Engines and Internet Portals

- content-based results and user-sensitive navigation
- semantic, personalized, and contextualized search
- social search and tapping into collective knowledge
- informative, as opposed to merely indicative, search result summaries

### Sensemaking for Legal Applications

- accelerated understanding of a large, dynamic corpus of documents
- automated content extraction, tagging, categorization, and summarization

### Sensemaking for Healthcare

- automated pre-processing and documentation assembly
- research for health insurance claims and fraud/liability investigations

## About the Research Teams

PARC's influential natural language processing researchers invented the finite-state morphology (FSM) technology behind most spellcheckers today and co-invented the powerful lexical functional grammar (LFG) approach that enables deeper processing of content. They have constructed a "semantic pipeline" of technologies, from extracting facts and representing knowledge to inferring beyond the text.

PARC's user interface researchers pioneered the graphical user interface (GUI), 3-D visualization and navigation technologies, and the first commercial mouse. They have also shifted the focus from human-computer interaction to human-information interaction, emphasizing how users interact with information not just devices. The researchers are able to optimize technologies for user-valued features through cognitive task analyses, user modeling, and underlying theories of cognition.

These research teams often work together and recently created intelligence-analysis and question-answering tools for the U.S. government.

**[www.parc.com/sensemaking](http://www.parc.com/sensemaking)**