

Usability: A Grand Research Challenge for Computer Systems

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One of the great challenges facing computer systems today is the need to simplify their use and maintenance. Although this is far from a new observation, even personal computers are still dauntingly difficult for ordinary people to use and maintain.

Some usability improvements have occurred over the last decade or so. The World Wide Web, at least in its initial form, provides a uniform, simple interface to vast quantities of information and services, and its simplicity is largely responsible for the participation of nearly half the globe in the Internet today. But that is one small success story in what is currently a usability quagmire.

Today, personal computers, when taken out of the box, and assuming they have been fully configured with software and hardware before reaching the end user, can easily be used for basic tasks.

However, almost any change to the initial configuration of the computer is likely to cause what seem like mysterious problems for the end user. Changes can be caused simply by running application software, which modifies global system settings. Even at this late date, setting up networking options is still complex and error prone. And all aspects of computing systems having to do with security are in the usability equivalent of the dark ages.

Because so many of the workings of computer systems are opaque, many ordinary users treat their personal computers superstitiously; avoiding or fixing problems becomes akin to appeasing mythological gods.

The flexibility of computers and computer software is what gives them tremendous power, but is what also makes them too complex to use. Specialized electronic devices solve the complexity/flexibility tradeoff by performing only limited tasks. This solution, however, leads to an ungainly proliferation of devices and in the end will probably require interoperability features which may well end up becoming as complex as the original full-powered computer.

Major roadblocks to solving this problem include the existence of market forces and competing interests of software and hardware

vendors, the inherent complexity of designing interoperating software, conflicts in standards and formats, and the complexities inherent in the barriers necessary for security and privacy protection.

Creating networked computer systems that are easy to configure, use and fix is probably the most difficult social and technical challenge remaining for computer systems.

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Short Biography for Marti Hearst
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Marti Hearst is an assistant professor in the new School of Information Management and Systems at UC Berkeley. She received BA, MS, and PhD degrees in Computer Science from the University of California at Berkeley. After completing her PhD in 1994 she joined Xerox PARC as a Member of the Research Staff. In Fall 1997 she joined the faculty at SIMS.

Professor Hearst is a recipient of an NSF Career Grant, a Hellman Faculty Fund Award, an Okawa Foundation Fellowship, and an Excellence in Teaching Award.

She is currently on the editorial board of ACM Transactions on Information Systems (TOIS) and ACM Transactions on Computer-Human Interaction (TOCHI). She was formerly on the editorial board of Computational Linguistics and IEEE Intelligent Systems, and she was the program co-chair of ACM SIGIR 1999.

At Berkeley she has taught courses in Information Organization and Retrieval, Information Visualization, Text Data Mining, User Interface Design and Development, and Foundations of Software Design.

Prof. Hearst's research in computational linguistics includes early work on statistical word sense disambiguation, automatic acquisition of lexical relations, and multi-paragraph discourse segmentation, better known as TextTiling. Her more recent focus has been on user interfaces for information access, and she has recently completed the first textbook chapter on this topic. Along with co-authors, she has developed several user interfaces for information access, including Flamenco, TileBars, Scatter/Gather, the Cat-a-Cone, and the Cha-Cha Web Intranet search interface. She is also working on a project for

automating usability assessment of web sites, and on statistical semantic grammars for text mining.