

Introduction to the Special Issue on Intelligent User Interfaces

James Lester

■ Recent years have witnessed significant progress in intelligent user interfaces. Emerging from the intersection of AI and human-computer interaction, research on intelligent user interfaces is experiencing a renaissance, both in the overall level of activity and in raw research achievements. Research on intelligent user interfaces exploits developments in a broad range of foundational AI work, ranging from knowledge representation and computational linguistics to planning and vision. Because intelligent user interfaces are designed to facilitate problem-solving activities where reasoning is shared between users and the machine, they are currently transitioning from the laboratory to applications in the workplace, home, and classroom.

This special issue on intelligent user interfaces features a panorama of projects that highlight recent advances in the state of the art. Most of these projects have been presented at the premiere forum for intelligent user interface (IUI) research, the International Conference on Intelligent User Interfaces. The articles in this issue share three common themes. First, they describe projects that explore the boundaries of the man-machine interface. As a result, they examine issues that span both AI and human-computer interaction (HCI). Second, the articles all describe implemented systems. Although IUI work is evolving a strong theoretical basis, much of the cutting-edge activities take an “experimental systems” approach that revolves around iterative design, implementation, and evaluation of IUIs with human subjects. Third, the articles describe task-oriented IUIs, that is, IUIs designed to support a specific family of tasks such as planning or tutoring.

The issue opens with three articles that present long-term efforts to create “conversational” IUIs. The first article, by Chuck Rich, Candy Sidner, and Neal Lesh, describes a project at the Mitsubishi Electric Research Laboratory to create a collaborative IUI that exploits the metaphor of conversation. Based on a rich theory of collaborative discourse, the COLLAGEN project explores the complex theoretical and engineering issues in devising a full-scale application-independent framework for collaborative IUI. Second, James Allen and his colleagues describe their decade-long work on spoken dialogue interfaces. Illustrating their discussion with the TRAINS and TRIPS systems, they explore the complexities of spoken dialogue and present solutions that have evolved in their lab. Third, Art Graesser, Kurt VanLehn, and their colleagues describe the features of complex multiturn tutorial dialogues. They present the joint work under way in their laboratories on the AUTOTUTOR, ANDES, ATLAS, and WHY2 systems, perhaps the most sophisticated tutorial dialogue projects in the intelligent tutoring systems community.

The second half of the issue features four articles that take an agent-oriented approach to IUIs. First, Elisabeth André and Thomas Rist describe work at DFKI on *animated agents*, which are lifelike characters that communicate multimodally with users in real time. Their character-based presentation research, which began with the Personalized Plan-Based Presenter (PPP) Project, exploits a flexible planning framework that supports the full range of communication, even in highly interactive multicharacter environ-

ments. Second, Justine Cassell describes her work at the Massachusetts Institute of Technology Media Lab on creating embodied conversational agents. She outlines the representations that an embodied conversational agent must maintain to successfully carry on dialogues with users and describes the role of social collaborative behavior models. This discussion is illustrated with the behavior of REA, an implemented agent that includes vision, natural language-understanding, and natural language-generation capabilities.

Third, Lewis Johnson presents the work under way in his lab at the University of Southern California Information Sciences Institute on animated pedagogical agents. Johnson’s agents represent the state of the art in animated agents for intelligent tutoring systems. By monitoring students’ activities in rich learning environments, these lifelike characters keep students on task to help them acquire a broad range of problem-solving skills. Fourth, Robert St. Amant and Michael Young describe their work at North Carolina State University on creating interface agents. By exploiting the computational properties of the “model worlds” of interfaces, they are able to provide solutions that are both effective and tractable. They illustrate their discussion with VISMAP and MIMESIS, two systems from their laboratory.

Collectively, these articles present a vivid snapshot of the frontier of IUI research. From both the researcher’s and the practitioner’s perspective, it is evident that the future looks remarkably bright where AI meets the user interface.

James Lester is associate professor of computer science at North Carolina State University. He received his Ph.D. from the University of Texas at Austin in 1994. Lester’s research focuses on computational linguistics, intelligent multimedia systems, and animated pedagogical agents. His group designs, constructs, and empirically evaluates intelligent user interfaces for educational applications. Lester served as program chair for the 2001 International Conference on Intelligent User Interfaces and currently serves on the editorial board of *Autonomous Agents and Multi-Agent Systems*. His e-mail address is lester@csc.ncsu.edu.



Call for Applications

Seventh SIGART/AAAI Doctoral Consortium

July 28–August 1, Shaw Convention Center, Edmonton, Alberta, Canada

Sponsored by the American Association for Artificial Intelligence and ACM SIGART

Collocated with AAAI-02

AAAI and ACM/SIGART invite students to apply for the Seventh AAAI/SIGART Doctoral Consortium. The Doctoral Consortium (DC) provides an opportunity for a group of Ph.D. students to discuss and explore their research interests and career objectives with a panel of established researchers in artificial intelligence.

The consortium has the following objectives:

- To provide a setting for mutual feedback on participants' current research and guidance on future research directions
- To develop a supportive community of scholars and a spirit of collaborative research
- To support a new generation of researchers with information and advice on academic, research, industrial, and non-traditional career paths
- To contribute to the conference goals through interaction with other researchers and participation in conference events.

The Doctoral Consortium will be held as a workshop on July 28-29, 2002, immediately before the start of the main conference. Student participants in the Doctoral Consortium will receive complimentary conference registration and a fixed allowance for travel/housing.

Important Dates for Application Submission

- February 11, 2002: Application Package Submission Deadline
- March 18, 2002: Acceptance Notification
- July 28-29, 2002: Doctoral Consortium

The Application Packet

Applicants to the Doctoral Consortium must submit a packet consisting of six copies of the following items. Hard copy submissions are required; no electronic submissions will be accepted.

1. *Thesis Summary.* A two-page thesis summary that outlines the problem being addressed, the proposed plan for research, and a description of the progress to date. Please be sure to distinguish between work that has already been accomplished and work that remains to be done. Be sure to include a title for your work.
2. *Background Information.* Information (at most two pages) on your background and relevant experience. This should include information typically found in a curriculum vita, plus additional information that may indicate your potential contribution to the DC.
3. *Letter of Recommendation.* A letter of recommendation from your thesis advisor. It must include an assessment of the current status of your thesis research, and an *expected date for thesis submission*. In addition, your advisor should indicate what he or she hopes you would gain from participation in the DC.
4. *Participant's Expectations.* A short (one page or less) statement of what you expect to gain from presenting and participating in the DC, as well as what you think you can contribute to the DC.

Mail your submission packet to:

AAAI/SIGART Doctoral Consortium
445 Burgess Drive
Menlo Park, CA 94025-3442
Telephone: 650-328-3123

Review Process

The consortium organizing committee will select participants on the basis of their anticipated contribution to the workshop goals. We solicit applications from any topic area and methodology within artificial intelligence. Students will be selected who have settled on their thesis direction, but still have significant research to complete. The perfect stage is having just had a research proposal accepted by the thesis committee. Students will be selected based on clarity and completeness of the submission packet, stage of research, advisor's letter, and evidence of promise such as published papers or technical reports.

At the Conference

The organizers invite all students to attend and participate in the Doctoral Consortium, whether or not they apply to present their work. In previous years, many nonpresenting students said they found it useful to observe their peers' presentations and to participate in the ensuing discussions.

All participants selected to present their work at the Doctoral Consortium are expected to be present throughout the consortium. Our experience has been that participants gain almost as much by interacting with their peers as by having their presentations critiqued by the faculty panel. As such, we expect a commitment from participating students to attend the entire DC.

Acknowledgements

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Inquiries

Additional information may be obtained by contacting the chair of the organizing committee:

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