

The Fifth International Conference on User Modeling

David N. Chin

■ The Fifth International Conference on User Modeling (UM-96) is part of a recently established, biennial conference series that provides a forum for researchers in the field of user modeling and user-adapted interaction. The next major software revolution after graphic user interfaces will be software that adapts itself to the user. By adapting to the user's needs, preferences, knowledge, language, and even moods, software will attain new levels of usability and broad acceptance that would not be possible without built-in models of the user. This conference series provides a forum for recent research in the field, ranging from theoretical foundations to implemented systems to controlled studies of the human-computer interfaces of user-adapted systems. Further information about the conference is located at www.um.org/conferences.html.

Almost 100 attendees with backgrounds in AI, human-computer interaction, psychology, education, library sciences, and other related areas gathered in Kailua-Kona, Hawaii, in early January 1996 for paper sessions, invited talks, tutorials, miniworkshops, special interest group (SIG) meetings, system demonstrations, a poster session, and a doctoral consortium. The invited talks included "Multimodal Interactive Maps: Designing for Human Performance" by Sharon Oviatt (Oregon Graduate Institute) and "Moving Up the Information Food Chain: The Internet Softbot and the METACRAWLER" by Oren Etzioni (University of Washington). Tutorials included "Student Modeling and Intelligent Tutoring Systems" by James Greer (University of Saskatchewan, Canada), "Bayesian Networks, Dempster-Shafer Theory, and Fuzzy Logic in User and Student Modeling" by Anthony Jameson (University of Saarbrücken, Germany), and "Multimedia and User Modeling" by

Mark Maybury (MITRE). Miniworkshops included "The Commercial Potential for User Modeling," "Standardization of User Modeling Shell Systems," and "User Modeling for Information Filtering on the World Wide Web." SIG meetings included "Developing Adaptive Applications (with the User Modeling Shell System BGP-MS)."

Two papers shared the best paper award. Kathleen McCoy and Christopher Pennington (both from the University of Delaware) presented a system for correcting English syntax using malrules. A subset of likely malrules is selected for particular users based on a model of the user's first language and a model of second-language acquisition that takes into account language transfer problems. They applied their method to teaching written English to American Sign Language speakers. Sharing the best paper award was Susanne van Mulken (University of Saarbrücken), who presented a method for probabilistically assessing the ease of understanding of interactive, computer-generated, multimedia presentations. She used Bayesian networks to combine the knowledgeability of the user (in the domain and in graphic conventions) with presentation factors such as the degree of ambiguity of a multimedia convention (for example, zigzag lines) in context and the familiarity of the convention as represented by its frequency of use. The Bayesian network (based on work by Anthony Jameson) allows updating of both user knowledgeability and presentation factors on user feedback.

Paper sessions were entitled Information Filtering, Adaptive Interfaces: Principles and Techniques, Student Modeling, Plan Recognition, Applications, Natural Language, and Cognitive Models. The Information-Filtering session included papers about

agents to support search on the World Wide Web (for example, looking for new links, notifying about updates to links, and having uniform access to search engines); the use of analogical user modeling (analogy over a conceptual granularity hierarchy) for document filtering; a comparison of movie-selection techniques using features (predict movie rating from similarity of the movie's features to previously rated movie features) or cliques (predict rating based on the average rating of the user's clique or group); and information filtering using a combination of vector-space model, document classification by unsupervised learning, and a relevance-feedback user model.

The paper session on adaptive interfaces featured presentations on learning the user's idiosyncratic grammar using an adaptive parser within a unification-based grammar formalism, an investigation of the effect of the style of graphic data models on the user's reading strategies, and the use of user models to design presentations in real time with immediate user feedback in a formal abductive framework. The session on student modeling included papers on using a Bayesian network to probabilistically trace the student's solution path and domain (Newtonian mechanics) knowledge; using a model of student scores to guide feedback and coached tutoring (selection of topics, exercises, study, and practice methods); using overlays on a network of student capabilities, instructional objectives, and teaching materials to track a student's progress (visual tools support building-displaying the network); and modeling a second language learner as a combination of correct and erroneous language transfer from the first language, allowing the system to identify the type of error for tutoring. The session on plan recognition included presentations on computing user plan preferences with Dempster-Schafer theory based on situations (previously trained with an ID3 algorithm) and an analysis of several non-probabilistic plan-preference heuristics and the conditions under which these have probabilistic equivalents.

The session on applications includ-

ed papers on case-based guidance for hypermedia with cases indexed by neural net and with a payoff matrix model to determine optimal actions (including communications) for a decision-support system. The session on natural language featured talks on selecting dialog moves by using a subordinate instantiation of the system (global anticipation feedback) to predict user responses, dialog strategies for tutoring the user (modeled as a weighted overlay) about causality in physics; dividing up explanations to avoid cognitive overload based on a parametric process model of concept learning; and generating arguments in the chess domain by selecting paths through an argument graph based on a model of the user's beliefs, inferences (sound and unsound), and ability level. The session on cognitive models consisted of reports on a non-monotonic belief logic for formalizing reasoning about the beliefs of incomplete agents (that is, agents that sometimes overlook inferences), experiments that show users' self-confidence (their own performance prediction) does not match actual performance but tracks the difficulty of the hardest elements of the task, and a user model for modeling fault diagnosis that combines an overlay of the system knowledge with a mean-ends analysis of the diagnosis process.

The UM-96 program cochairs were Sandra Carberry (University of Delaware) and Ingrid Zukerman (Monash University, Australia). The local arrangements chair was Martha Crosby (University of Hawaii), and the conference chair was David N. Chin (University of Hawaii). We are indebted to the American Association for Artificial Intelligence for sponsorship of student travel grants, Kluwer Academic Publishers for sponsoring the best paper award, and the University of Hawaii for equipment loans.



David N. Chin is an associate professor of information and computer sciences at the University of Hawaii. He has been heavily involved in establishing and promoting the field of user modeling. His e-mail address is chin@hawaii.edu.

AAAI-96 Workshop on Internet-Based Information Systems

Alexander Franz

The Workshop on Internet-Based Information Systems, held as part of the Thirteenth National Conference on Artificial Intelligence, provided a venue for researchers to discuss the role of AI and related fields in network-based information systems. Not surprisingly, most of the discussion focused on the World Wide Web (WWW), and a good part of the workshop was devoted to topics related to WWW search and retrieval. A number of presentations addressed ways to improve search accuracy and efficiency. Methods under discussion included statistical modeling, machine-learning techniques, and the addition of ontologically categorized metadata to WWW pages. An invited talk by Michael Mauldin of Lycos Inc., who described the development, commercial deployment, and current state of the LYCOS search engine, provided an industrial perspective on this topic. It seems certain that research in this area will continue to expand. At the same time, the successful transfer of research results to commercial search engines will require persuasive cost-benefit analyses for new proposed methods.

A second major theme was the use of natural language-processing techniques for analyzing WWW pages. For example, two presentations described means of taking advantage of the question-answer format of frequently asked question (FAQ) files to provide more precise information-retrieval abilities (albeit limited to the narrowly circumscribed domains covered by FAQ files). To address the bottleneck of manually creating hypertext from linear documents, another

presentation described a technique for the automatic creation of hypertext links between related passages.

A second invited talk by Peter Pirolli of Xerox Parc described an ecologically inspired model, based on optimal foraging theory, that views WWW browsing as foraging for information. A related theme that emerged at the workshop concerns the study of the differences between various information services on the internet, such as talk, internet relay chat, e-mail, mailing lists, news groups, and web pages. We can expect further research into human information-seeking behavior on the internet, especially because accurate predictive models could result in immediate practical benefits, such as improved caching and prefetching schemes for HTTP (hypertext transfer protocol) proxy servers. On the whole, the considerable interest in this workshop, as well as other activities on internet-related topics at AAAI-96 and elsewhere, makes it evident that the AI research community's interest in the internet continues to grow apace. Further information about the workshop is located at www.csl.sony.co.jp/person/amf/iis96.html.



Alexander Franz is a researcher at Sony's Computer Science and D21 Laboratories. He received a Ph.D. in computational linguistics from Carnegie Mellon University. His research interests include speech, natural language, and multilingual information and communication. His e-mail address is amf@csl.sony.co.jp.