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Editorial Introduction

The Fourteenth Innovative Applications of Artificial Intelligence Conference (IAAI-2001)

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The Thirteenth Innovative Applications of Artificial Intelligence Conference (IAAI-2001) was held on 7 to 9 August 2001 in Seattle, Washington, in conjunction with the Seventeenth International Joint Conference on Artificial Intelligence. As in past years, papers were solicited in two categories: (1) deployed applications and (2) emerging applications and technologies. *Deployed applications* are systems that have been in use for at least several months by individuals or organizations other than their developers, have measurable benefits, and incorporate AI technologies. *Emerging applications* are technologies and systems that are close to deployment and clearly show an innovative implementation of AI technologies. All these case studies are of value not only to other application developers looking for guidance in applying various techniques to their own applications but also to researchers who need to understand the myriad of technical challenges provided by real-world problems.

At IAAI-2001, five deployed applications and seven emerging application papers were presented. In addition, IAAI hosted three invited talks and one panel discussion. The papers from IAAI-2001 display a remarkable breadth of applications. This continuing stream of applications serves as proof of the vitality and innovation in the field of AI. Deployed application areas included load layout for military rapid deployment ships, land management, assistance for online sales, synthetic agents for military training, and automation of space mission operations. Emerging applications included an even broader range of applications, including protein crystal analysis, text correction, web search, analysis of interoperability, taskable software agents, aircraft flight path planning, and information extraction. In addition, the conference included several invited talks. Maurice Hurley gave an intriguing talk on AI in science fiction entitled "Imagining the Sentient Machine." Harold Cohen presented an enlightening perspective in his talk "Decoupling Art and Affluence." Rodney Brooks entertained us all with a talk entitled "Mass Market Intelligent Robots." Finally, John Riedl led a panel on personalization, an area where quite a few companies are developing the next generation in marketing and sales.

In this special issue, we selected six papers: one emerging application and five deployed applications. We asked the authors to expand on their conference papers to provide deeper insight into the problems being solved. These articles provide an excellent snapshot into the innovative applications being deployed that leverage AI technologies.

The first paper, ELECTRIC ELVES: Agent Technology for Supporting Human Organizations by Hans Chalupsky, Yolanda Gil, Craig Knoblock, Kristina Lerman, Jean Oh, David Pynadath, Thomas Russ, and Milind Tambe, describes an emerging application. The authors explain how software agents can be used to facilitate meetings, track individuals, gather and disseminate information, and assist other organizational efforts. The ELECTRIC ELVES Project uses workstations, fax machines, cell phones, and palm pilots to integrate information to support human operations.[1] The ELECTRIC ELVES use several AI technologies, including multiagent and teamwork technologies to coordinate the many assets, information integration agents to find and assimilate many information sources, and knowledge representation and reasoning techniques to describe the agents and the knowledge they use. This article provides an excellent view into how AI technologies and ubiquitous computing will revolutionize everyday lives of high-tech workers and organizations.

The RADARSAT-MAMM Automated Mission Planner by Benjamin Smith, Barbara Engelhardt, and Darren Mutz[2] describes the deployment of the Automated Scheduling and Planning Environment at the Jet Propulsion Laboratory (JPL) to automate mission planning for the Modified Antarctic Mapping Mission (MAMM)[3] in fall 2000. This deployment had a number of significant impacts. First, automating mission planning for this mission enabled a reduction in effort to generate mission plans from 52 work weeks for the first Antarctic Mapping Mission in 1997 to 8 work weeks for MAMM, which was a more complex mission. Automation also enabled generation of many contingency plans that could not be generated for the first mission because of work force limitations. Generation of these contingencies reduced the mission replanning team by fourfold.

The generated plans performed flawlessly during the mission with not a single spacecraft anomaly because of flawed plan generation.

Interchanging Agents and Humans in Military Simulation by Clinton Heinze, Simon Goss, Torgny Josefson, Kerry Bennett, Sam Waugh, Ian Lloyd, Graeme Murray, and John Oldfield describes the use of agent technology to assist in training for military operations. This article describes how agents are used to stand in for humans in AP-3C aircraft flight operations. This system has been deployed and is in use by the Royal Australian Air Force for both training and development of tactics. In training use, humans can replace one or more of the software agents and practice operations in a wide range of scenarios and simulations. The same software can be used to develop tactics by implementing the tactics as the behaviors for software agents and observing the agents performance over the operational settings of interest. The entire agent, modeling, and simulation framework was explicitly designed to facilitate this important dual use.

CARMA: A Case-Based Rangeland Management Adviser by John Hastings, Karl Branting, and Jeffrey Lockwood describes an intriguing application of case-based reasoning (CBR) and adaptation to perform rangeland management. In this application, an intelligent system is used to support pest management, with a focus on forage consumption by grasshoppers. In the CARMA system, CBR is first used to retrieve the closest match to a new problem. Next, CARMA uses temporal projection, feature adaptation, and critical period adaptation to adapt this case to the current situation. Temporal projection and critical period adaptation use a rangeland ecosystem model to perform this adaptation. In a true showcase of AI flexibility, CARMA has also been used to support decision making other than rangeland management, including evaluating disaster areas, determining policies for pesticide use, and researching pest management.

NATURAL LANGUAGE ASSISTANT—A Dialog System for Online Product Recommendation by Joyce Chai, Veronika Horvath, Nicolas Nicolov, Margo Stys-Budzikowska, Nanda Kambhatla, and Wlodek Zadrozny describes a system to help users find product and service information in electronic-commerce sites. The NATURAL LANGUAGE ASSISTANT (NLA) uses natural language processing to derive concepts of interest to the user. NLA then uses a concept hierarchy knowledge base to direct the user to the appropriate information. Several studies have shown that users prefer the NLA approach to menu-driven navigation systems. NLA also offers advantages over traditional text search and keyword-matching approaches in that it uses semantic knowledge to perform additional filtering, thus enabling NLA to be more likely to find useful information. The NLA application provides an excellent view into the synergies and opportunities at the intersection of AI and electronic commerce.

TALPS: The *T-AVB* Automated Load Planning System by Paul Cerkez describes the use of rule-based systems to encode a constraint-based approach to layout of military loads in *T-AVB* rapid-deployment ships. TALPS encodes constraints such as space, electrical system access, hatches, and equipment access, that influence search. TALPS also encodes heuristics in the form of default configurations. TALPS then uses information about the specific ship being loaded and load containers to rapidly develop a load plan. This system is currently in use by U.S. Marine Corps Aviation to develop load plans.

These six articles provide a good sampling of current applications that are making or might soon make a difference in lives of non–AI practitioners. In some of these articles, AI technology plays a central role. In others, AI is a key part of a larger system. In all cases, the application provides an interesting perspective on how AI technologies must be adapted and fitted into a larger operational context. These applications document the diverse range of problems that AI technology is solving in today's world. We in the AI community can take pride in these innovative applications and look ahead to even more fascinating and effective uses of AI technology in the future.

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Notes

1. www.isi.edu/e-elves/.
2. aspen.jpl.nasa.gov.
3. www-aig.jpl.nasa.gov/public/planning/mamm/.

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