AI Magazine Volume 23 Number 4 (2002) (© AAAI)

The Fifteenth Innovative Applications of Artificial Intelligence Conference (IAAI-2002)

Steve Chien (Conference Chair) and
John Riedl (Conference Cochair)

The Fourteenth Innovative Applications of Artificial Intelligence Conference (IAAI-2002) was held from 28 July to 1 August in Edmonton, Alberta, Canada, in conjunction with the Seventeenth National Conference on Artificial Intelligence (AAAI-2002). As in past years, papers were solicited in two categories: (1) deployed applications and (2) emerging applications and technologies. *Deployed application* papers describe 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. These papers 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 unique technical challenges provided by real-world problems.

For IAAI-2002, we received 54 submissions, containing a wealth of outstanding applications and emerging technology papers (15 deployed and 39 emerging). Of these 54 submissions, the program committee accepted 7 deployed and 11 emerging papers for a 33-percent acceptance rate. Because of the large number of submissions, the program committee was only able to accept the most significant papers. In many cases, we deferred acceptance of papers in the belief that the paper would be even stronger or more compelling with another year of data, experience, or development. The papers from IAAI-2002 display a wide range of applications. This continuing stream of applications shows that AI continues to grow vibrantly in the new millennium. Deployed application areas included scheduling of university exams, information extraction, web-based customer service, engineering configuration, military education, call center scheduling, and quote generation for sales. Emerging applications included an even broader range of applications, such as military decision support, ship control, knowledge formation, virtual reality for training, computer security, and travel planning.

In addition to the paper presentation track, IAAI hosted a number of special events. Robin Murphy gave an invited talk on robot-assisted urban search and rescue at the World Trade Center, outlining a number of opportunities and challenges for AI and robotics research. Challenges of robustness and reliability and human-machine interface and systems represent core issues to the IAAI community. In addition, IAAI and AAAI cohosted an invited talk by Raymond Kurzweil on human-level strong AI.

This year IAAI initiated the Entrepreneurship Track, a series of events focused on AI companies. In this track, Neil Jacobstein chaired a panel entitled Pioneering AI Businesses I: A 20-Year Review. In this panel, Jacobstein was joined by Ed Feigenbaum, Mark Fox, and Amos Barzilay in recounting and analyzing a number of AI companies that began in the early 1980s. Craig Knoblock chaired a panel entitled Pioneering AI Businesses II: Recent Startups. In this panel, Knoblock was joined by Tom Mitchell, Tuomas Sandholm, and Dan Weld in the discussion and analysis of several AI startups in recent years. Finally, Steve Chien and Minda Wilson organized the Entrepreneurs Forum, an informal event to facilitate interactions among members of the AI community involved or interested in the startup process. We received considerable positive feedback from participants in the Entrepreneurship Track and hope to continue it in future IAAI conferences.

For this special issue, we selected six papers—four deployed applications and two emerging technologies—and asked the authors to expand on their conference papers to enable a more in-depth view of the problems being solved. These articles provide an excellent cross-section of innovative applications being deployed that leverage AI technologies.

"MITAP for Bio-Security: A Case Study," by Laurie Damianos, Jay Ponte, Steve Wohlever, Florence Reeder, David Day, George Wilson, and Lynette Hirschman of the MITRE Corporation, describes a deployed application. The MITAP system extracts information from a wide range of online sources to enable users to track global events (such as infectious disease outbreaks). The system has been in use for over one year and synergistically uses AI technologies for translation, information detection, extraction, and summarization. Additionally, the system enables the users to annotate, augment, and organize extracted data for further dissemination. MITAP currently stores more than one million articles and processes thousands more daily. MITAP represents just one of a growing

class of systems needed to exploit the vast amount of information available electronically for uses ranging from health care to business intelligence.

"Staff Scheduling for Inbound Call Centers and Customer Contact Centers," by Alex Fukunaga, Ed Hamilton, Jason Fama, David Andre, Ofer Matan, and Illah Nourbakhsh of Blue Pumpkin Software, describes a deployed application of automated planning and scheduling technology. The article describes the DIRECTOR system, which is used to schedule staffing of call centers at over 800 contact centers worldwide. DIRECTOR produces contact center schedules by first projecting a model of contact volumes to compute staffing levels estimated to user-specified call response time goals. Next, DIRECTOR generates an initial staffing plan to attempt to meet the response time goals. DIRECTOR then successively refines the schedule to produce a higher-quality end schedule. DIRECTOR is indicative of how automated planning and scheduling technology is solving a wide range of logistics, supply chain management, enterprise resource planning, and resource-allocation problems in industry.

"Information Self-Service with a Knowledge Base That Learns," by Stephen D. Durbin, Doug Warner, J. Neal Richter, and Zuzana Gedeon of RightNow Technologies, describes a deployed application for online customer support. This article describes the use of multiple AI technologies from machine learning and collaborative filtering to enable organization of online help pages. The RightNow E-SERVICE CENTER uses both explicit user feedback (such as user scoring of usefulness of information) and implicit user feedback (user link-following logs) with machine learning to drive organization of the help pages based on relevance. The applications described in this article are indicative of how the internet can be used to provide increasing levels of customer support in an economic fashion.

"Training and Using DISCIPLE Agents: A Case Study in the Military Center of Gravity Analysis Domain," by Gheorghe Tecuci, Mihai Boicu, Dorin Marcu, Bogdan Stanescu, Cristina Boicu, and Jerome Comello of George Mason University and the U.S. Army War College, describes the DISCIPLE approach to agent development by subject-matter experts and its deployed application in the area of military education. The DISCIPLE-RKF/COG agent was taught using examples and explanations by a subject-matter expert in center of gravity analysis. The DISCIPLE agent was then used to teach military students, supporting them to develop center of gravity analysis reports of specific conflicts. The successful deployment of these instructional systems in military education represents a growing application area of intelligent systems in education and training.

"Applying Perceptually Driven Cognitive Mapping to Virtual Urban Environments," by Randall W. Hill, Jr., Changhee Han, and Michael van Lent of the Institute for Creative Technologies at the University of Southern California describes an emerging technology. In this article, the authors describe algorithms for modeling realistic human perception of the physical environment. The algorithms take ground-level view input, such as would be acquired by people walking around a city, and develop a realistic model of the geography of the area represented as open spaces and paths connecting open spaces. This technology is used by virtual agents to enable immersive training systems for the United States Army and provides an excellent insight into the area of immersive training and synthetic environments—an area of tremendous growth and opportunity for AI.

"Computational Vulnerability Analysis for Information Survivability," by Howard Shrobe, describes an emerging application area of protecting information systems from electronic intrusion and attacks. Shrobe describes a structured approach to representing information systems and using this knowledge to represent and reason about possible ways to compromise an information system. This article is an excellent introduction to the area of AI for understanding information systems operation and vulnerabilities—again an area of tremendous opportunity for AI researchers and practitioners alike.

These six articles are excellent examples of applications and technologies that have already or will soon have a significant impact in the commercial or governmental world. 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 unique insight into how AI technologies are adapted and fitted into a larger operational context. These articles document the diverse range of problems that AI technology is solving in today's world. The AI community can take pride in these innovative applications and look ahead to even more interesting and high impact uses of AI technology in the future.

Acknowledgments

We thank the authors for their efforts in rewriting and expanding their conference papers. We also thank the IAAI-2002 program committee members for their help and expertise in the selection of papers and formation of the rest of the conference: Bruce Buchanan, Bob Engelmore, Randy Hill, Neil Jacobstein, Craig Knoblock, David Kortenkamp, Ora Lassila, David Opitz, Daniel Marcu, Ted Senator, Howard Shrobe, Reid Smith, Sam Uthurusamy, and Peter Wurman. The 2002 IAAI conference also benefited greatly from the exceptional support of Keri Harvey and Carol Hamilton and the rest of the office staff at the American Association for Artificial Intelligence. Finally, this special issue would not have been possible without the outstanding support of David Leake of *AI Magazine*.