



1999 Spring Symposium Series

March 22-24, 1999

Stanford University, California

Call for Participation

Sponsored by the
American Association for Artificial Intelligence
445 Burgess Drive
Menlo Park, CA 94025
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www.aaai.org/Symposia

The American Association for Artificial Intelligence presents the 1999 Spring Symposium Series to be held Monday through Wednesday, March 22-24, 1999, at Stanford University. The topics of the seven symposia are:

- Agents with Adjustable Autonomy
- AI Equipment Maintenance Service and Support
- Artificial Intelligence and Computer Games
- Hybrid Systems and AI: Modeling, Analysis and Control of Discrete + Continuous Systems
- Intelligent Agents in Cyberspace
- Predictive Toxicology of Chemicals: Experiences and Impact of AI Tools
- Search Techniques for Problem Solving Under Uncertainty and Incomplete Information

Symposia will be limited to between forty and sixty participants. Each participant will be expected to attend a single symposium. Working notes will be prepared and distributed to participants in each symposium.

A general plenary session, in which the highlights of each symposium will be presented, will be held on Tuesday, March 23, and an informal reception will be held on Monday, March 22.

In addition to invited participants, a limited number of other interested parties will be able to register in each symposium on a first-come, first-served basis. Registration information will be available by December 15, 1998. To register, contact:

AAAI
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Submissions

Submissions for the symposia are due on October 30, 1998. Notification of acceptance will be given by November 13, 1998. Material to be included in the working notes of the symposium must be received by January 29, 1999. See the appropriate section below for specific submission requirements for each symposium.

This document is available at www.aaai.org/Symposia/Spring/1999/sssparticipation-99.html

Agents with Adjustable Autonomy

Adjustable autonomy means dynamically adjusting the level of autonomy of an agent depending on the situation. For real-world teaming between humans and autonomous agents, the desired or optimal level of control may vary over time. Hence, effective autonomous agents will support adjustable autonomy. This contrasts with most work in autonomous systems, in which the style of interaction between the human and agent are fixed by design.

The adjustable autonomy concept includes the ability for humans to adjust the autonomy of agents, for agents to adjust their own autonomy, and for a group of agents to adjust the autonomy relationships within the group. Effective adjustable autonomy minimizes the necessity for human interaction, but maximizes the capability for humans to interact at whatever level of control is most appropriate for any situation at any time. Topics include, but are not limited to:

- Human-involved procedure execution
- Mixed-initiative planning
- Monitoring and situation awareness
- Anytime behavior modification of agents
- Maximizing effective collaboration between humans and agents
- Human-centered autonomous systems
- Understanding/controlling agents having adjustable autonomy
- Validation and verification of agents having adjustable autonomy
- Resource and constraint-based autonomy
- Levels of autonomy
- Safety and fault-tolerance
- Mission criticality
- Long-distance interaction

- Modeling and predicting behavior
- Reasoning about communication
- Prioritized tasking
- Case studies on problems in mixed human-machine operations
- Associate systems and overlapping competence
- Command-by-exception
- Flexible team organization between humans and agents
- Question-asking to achieve sufficient task clarity

Submissions

We seek papers (up to 8 pages) or abstracts (1-2 pages) on the topics listed above and related topics. Submissions should be submitted electronically. Additional information regarding the symposium, including instructions on sending submissions, can be found at: tommy.jsc.nasa.gov/~korten/aaai-ss99/

Organizing Committee

Barney Pell (pell@ptolemy.arc.nasa.gov) (cochair), NASA Ames Research Center, MS 269-2 Moffett Field, CA 94035-1000; David Musliner (musliner@htc.honeywell.com) (cochair), Honeywell Technology Center, MN65-2600, 3660 Technology Drive, Minneapolis, MN 55418; Gregory Dorais NASA Ames Research Center (gadorais@ptolemy.arc.nasa.gov); David Kortenkamp, Metrica, NASA Johnson (david.m.kortenkamp1@jsc.nasa.gov); Nicola Muscettola, NASA Ames Research Center (mus@ptolemy.arc.nasa.gov); and Milind Tambe, USC Information Sciences Institute (tambe@isi.edu).

AI in Equipment Maintenance Service & Support

In a recent paradigm shift, manufacturing companies who experience a reduction of profit margins in their traditional businesses try to maintain and grow their market share by offering their customers novel and aggressive service contracts. In these new offerings the old parts & labor billing model is replaced by guaranteed uptime. This in turn places the motivation to maintain equipment in working order on the servicing company.

As a result there is a strong and renewed emphasis on AI technologies that can be used to monitor products and processes, detect incipient failures, identify possible faults (in various stages of development), determine the preventive or corrective action, generate a cost-efficient repair plan and monitor its execution. The service market delivered will include manufacturing (such as aircraft engines, appliances, locomotives, etc.) and non-manufacturing (such as financial systems, medical systems, etc.) based businesses. This workshop aims to address relevant AI technologies which address segmentation, classification, prediction, and decision making in particular in:

- Adaptation to changing environments
- Decision making of autonomous systems (from a service point of view)
- Information fusion of various diagnostic modules to resolve conflicts and aggregate information expressing uncertainty in different domains
- Knowledge extraction from symptom databases
- Remote monitoring and diagnosis tasks
- Intelligent internet based agents for monitoring tasks

- Maintenance planning
- Corrective action planning
- Trend performance analysis and prognostics
- Reliability and margin prediction
- Machine learning to recognize and classify new system behavior
- Autonomous repair
- Reconfigurability

Submissions

Potential participants should submit either a full technical paper (8 pages maximum); a statement of interest (up to 1000 words) that is a description of an ongoing research effort; a position statement; a description of a problem to be discussed; or a description of tools, corpora, or other resources, especially if they can be shared with others.

Send all submissions electronically to goebelk@crd.ge.com. If you are unsure whether your file will print at our site, please submit four days before the deadline in order to receive a confirmation to Kai Goebel, GE Corporate Research and Development, K1-5C4A, One Research Circle, Niskayuna, NY 12309, USA. More information is available at the web site best.me.berkeley.edu/~goebel/ss99/aies.html

Organizing Committee

Alice Agogino, UC Berkeley (aagogino@euler.me.berkeley.edu); Piero Bonissone, GE Corporate Research and Development (bonissone@crd.ge.com); Kai Goebel, GE Corporate Research and Development (goebelk@crd.ge.com); George Vachtsevanos, Georgia Institute of Technology (george.vachtsevanos@ee.gatech.edu).

AI & Computer Games

The gaming industry has always been, and continues to be, an early adopter of AI techniques. The explosion of power in home computers has dramatically increased the potential for the use of AI techniques in computer games. Thus it would be useful for the gaming industry to be more directly tapped into the AI research community. Conversely, as an application area, entertainment provides new challenges for the AI research community. Increased communication could therefore benefit both communities.

This symposium is intended to bring together AI researchers and professionals from the entertainment software industry. It will provide a forum to explore mutual interests, including (but not limited to) new AI techniques for entertainment software, research avenues that might benefit the entertainment industry, and ways to more easily transfer technology. Activities will include presentations on products and research, as well as moderated discussions.

We would like to see a variety of game-related AI topics addressed, including:

- *The role of AI in computer games*
How is AI used in current computer games? What are the parameters of the problems that need to be solved? What will be the next AI-intensive area of gaming?
- *AI experiences*
In solving AI problems in your research or commercial product, what were your experiences with this research or product? How did it succeed and what were the pitfalls along the way?

- *Building long-term plans for technology transfer*

How can we integrate research projects into current and future computer games? What kinds of communication networks or publications can contribute to this? What kinds of common tools would allow these two groups to share code and ideas?

Submissions

Potential participants should submit a short paper (3-5 pages) describing a work recently completed or in progress that they would like to discuss or a proposal (1-2 pages) of questions to help seed a discussion on these or related topics. For all submissions, participants should include a submissions CV or resume highlighting their work in this area.

Send submissions to wolff@cs.nwu.edu; ASCII preferred and Acrobat or HTML accepted. System demonstrations are also accepted; please contact us before the submission date about logistics. Web page: www.cs.nwu.edu/~wolff/AAAI-symposium.html

Organizing Committee

Wolff Dobson (cochair), Northwestern University; Ken Forbus (cochair), Northwestern University; John Laird (cochair), University of Michigan; Mike van Lent, University of Michigan; Ernest Adams, Electronic Arts; and Andrew Stern, PF Magic.

Hybrid Systems & AI: Modeling, Analysis, and Control of Discrete + Continuous Systems

The use of digital computers to control continuous, dynamic processes has led to the development of hybrid (discrete + continuous) systems. The hybrid systems community is a cross-disciplinary community that combines modeling and analysis techniques for studying discrete event systems, with techniques from continuous systems and control theory. Hybrid behavior is generally described as intervals of piecewise continuous behaviors interspersed with discrete transitions. Each interval of continuous behavior represents a so-called mode of system operation; mode transitions represent discrete behaviors. Examples of hybrid systems include robots, air traffic control systems, and automated multi-vehicle highway systems.

The growing field of hybrid systems has seen a great deal of activity over the last few years often focusing on synthesis, verification and stability analysis of controllers for hybrid systems. Interestingly, a number of the problems addressed by this community are shared by AI researchers studying robotics, planning, simulation, verification, execution monitoring, decision analysis, reasoning about action, diagnosis, modeling and analysis of physical systems, and perception. This workshop aims to bring together these different communities to explore opportunities for exploiting AI representation and reasoning techniques for hybrid system modeling and analysis, and for integrating techniques from hybrid systems into current AI research. To accommodate the diverse background of the workshop

participants, we plan to design the workshop in a manner that will facilitate interaction and discourse among the participants. The format will include invited talks by researchers including Tom Henzinger, Alan Mackworth Shankar Sastry, and Brian Williams; theme-based presentations followed by facilitated discussion; panel sessions to discuss common problems; and opportunity for post-workshop discussion.

We invite submissions in a broad range of areas related to modeling, analysis and control of hybrid systems. Topics include but are not limited to knowledge representation techniques for modeling hybrid systems; reasoning and analysis techniques for hybrid systems; control of hybrid systems; models of offline versus online computation; and verification and validation of hybrid systems.

Submissions

Potential participants should submit a short paper describing work in progress, completed work, positions, comparisons, testbeds, tutorials, discussion topics or potential panels. For details see www.ksl.stanford.edu/springsymp99/.

Organizing Committee

Gautam Biwas (cochair), Vanderbilt Univ.; Sheila McIlraith (cochair), Stanford University; Craig Boutilier, Univ. of British Columbia; Dan Clancy, NASA Ames; Vineet Gupta, NASA Ames; Illa Nourbakhsh, Carnegie Mellon University; Erik Sandewall, Linkoping University; Henny Sipma, Stanford University; Claire Tomlin, Stanford University; Howard Wong-Toi, Cadence Berkeley Labs, Feng Zhao, Xerox PARC.

Intelligent Agents in Cyberspace

The growth of cyberspace comprising of the Internet, intranets and extranets, and the World Wide Web has been phenomenal. Cyberspace now contains enormous information and it is also rapidly being exploited for a number of business and other applications. However, effective use of cyberspace and of the information in it is becoming increasingly difficult.

There is now growing interest in deploying intelligent software agents for effective use of cyberspace. They can act as smart personal assistants, roam cyberspace to collect required information on behalf of the users and conduct a variety of business activities online. They could also collectively perform complex, collaborative tasks. To make significant progress in this area, however, we need to: 1) identify and explore opportunities for intelligent agents in cyberspace; 2) develop new, innovative applications; and 3) devise integrated, comprehensive approaches for their widespread deployment in cyberspace. The symposium aims to bring together researchers and developers in the areas of intelligent agents, information retrieval, electronic business and the Internet and Web to have focussed discussions on the current status of research and applications of intelligent agents in cyberspace and to explore directions for further work.

Topics of coverage include agent architectures for cyberspace; smart, adaptive, learning user interfaces; agent collaboration and coordina-

tion in cyberspace; innovative agent applications; testing and validation; technical, social and ethical issues in deploying intelligent agents in cyberspace, case studies and experience reports.

Submissions

Submissions (not exceeding 12 pages) describing completed work, work in progress, tutorials or positions/perspectives and proposals for panel discussion are solicited. They should be sent electronically to both the cochairs in PostScript or PDF format as an attachment to e-mail.

Those who would simply like to participate in the symposium should send an e-mail to both the cochairs highlighting their background and interest. For further information see btwebsh.macarthur.uws.edu.au/san/iac/

Organizing Committee

San Murugesan (cochair), University of Western Sydney Macarthur (s.murugesan@uws.edu.au); Daniel E. O'Leary (cochair), University of Southern California, (oleary@rcf.usc.edu); Athula Ginige, University of Western Sydney Macarthur; Bruton Janet, HP Labs; Christian Lemaitre Leon, Laboratorio Nacional de Informatica Avanzada; Elisabeth Andre, DFKI Gmbh; Katia Sycara, Carnegie Mellon University; Mark Maybury, MITRE Corp.; Michael Huhns, University of South Carolina; Munindar P. Singh, North Carolina State University; and Radhakrishnan, Concordia University.

Predictive Toxicology of Chemicals: Experiences and Impact of AI Tools

AI and related techniques play a major role in toxicity prediction. The goal of computational toxicity prediction is to describe the possible relationships between chemical properties, on the one hand, and biological and toxicological processes, on the other. This symposium will highlight the potential of different AI approaches, either individually and combined, for computational toxicity prediction.

Success in this research depends on the contribution of experts from different areas, and we invite participation from researchers in all related fields. We welcome AI researchers who have applied learning techniques to domains outside toxicity prediction and are in search of new areas. Some of the questions to be addressed in the symposium are:

- How do we represent chemical information? Several methods have been proposed. Are they equivalent? How do we evaluate them? Are results from different experiments reproducible?
- How can machine learning (including ANN, fuzzy logic, GA, ILP, ...) techniques be used? AI tools have yet to be fully evaluated in this domain. Which techniques are better for toxicity prediction, especially given our changing understanding of toxicology? Are hybrid approaches better?
- Are current experimental data sets sufficient for AI techniques? Do they have sufficient accuracy? How do we take advantage of existing data sets? Can we use techniques from data mining and reasoning under uncertainty?

To achieve a common background among both computer scientists and chemists, there will be short introductory presentations on the state of

the art in computational techniques, machine learning, chemical descriptors, and toxicological prediction. The rest of the sessions will include presentations (oral and poster) with a discussion on the open problems.

Submissions

Potential participants should submit an abstract describing work in progress, completed work, positions, or even open questions for discussion. Abstracts should be submitted electronically to gini@elet.polimi.it, including title, author's name(s), affiliation, mailing address, e-mail, phone and fax numbers. Participants may be invited to submit a longer version of their paper. All contributions will be collected in working notes. Some financial assistance is available for student participation. Further information and format for submissions will be posted at www.elet.polimi.it/AAAI-PT

Organizing Committee

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Search Techniques for Problem Solving Under Uncertainty and Incomplete Information

To build practical AI systems, one has to address issues related to uncertainty and incomplete information, which can result from actuator and sensor noise, reasoning with approximate models, limited communication bandwidth, insufficient domain understanding, and other sources.

This symposium will focus on the selection of search strategies for problem solving under uncertainty and incomplete information, where the large number of contingencies can create large search spaces. Using appropriate search strategies can significantly increase system performance by exploiting problem-specific knowledge and restricting the search to the right regions of the search spaces to find satisfactory solutions quickly.

The main purpose of the symposium is to bring together researchers and practitioners from areas such as planning, heuristic search, robotics, constraint satisfaction, game playing, and information gathering. We want to discuss when and how traditional search techniques (such as state-space search and local search) should be applied; how uncertain and incomplete information can be exploited to control search processes; whether there is a difference in principle between reasoning with deterministic and probabilistic representations of uncertain and incomplete information (for example, with constraint networks or belief networks); how the level of uncertainty affects problem complexity; how different search paradigms (such as heuristic search and dynamic programming) can be

combined to provide additional pruning power; and how the structure of search spaces can be exploited to speed up search. We also intend to explore how these search strategies can be applied across domains and application areas, and speculate on promising future search strategies.

The symposium will consist of one or two invited talks, followed by short presentations and longer discussions in an atmosphere that encourages the interaction of researchers with different backgrounds. All types of papers are sought, including papers describing theory, algorithms, applications, systems, performance measures, and other related issues. Papers on work in progress are encouraged. Other interested participants should send a short description of their research interests with a list of relevant publications. Submissions should be sent electronically to zhang@isi.edu. Detailed information, including paper format and length requirements, can be found at www.isi.edu/isd/zhang/SearchStrategies.html.

Organizing Committee

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