



1998 Fall Symposium Series

October 23-25, 1998

Omni Rosen Hotel, Orlando, Florida

Call for Participation

Sponsored by the
American Association for Artificial Intelligence
445 Burgess Drive
Menlo Park, CA 94025
650-328-3123
650-21-4457 (Fax)
fss@aaai.org
www.aaai.org/Symposia/

The American Association for Artificial Intelligence is pleased to present its 1998 Fall Symposium Series, to be held Friday through Sunday, October 23-25, 1998 at the Omni Rosen Hotel in Orlando, Florida. The topics of the eight symposia in the 1998 Fall Symposium Series are:

- Artificial Intelligence and Link Analysis
- Cognitive Robotics
- Distributed Continual Planning
- Emotional and Intelligent: The Tangled Knot of Cognition
- Formalizing Reasoning with Visual and Diagrammatic Representations
- Integrated Planning for Autonomous Agent Architectures
- Planning with Partially Observable Markov Decision Processes
- Robots and Biology: Developing Connections

An informal reception will be held on Friday, October 23. A general plenary session, in which the highlights of each symposium will be presented, will be held on Saturday, October 24.

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. 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 in early August.

To obtain registration information, write to:

AAAI Fall Symposium Series
445 Burgess Drive
Menlo Park, CA 94025-3442
Voice: 650-328-3123
Fax: 650 321-4457 (fax)
fss@aaai.org
www.aaai.org/Symposia/symposia.html

Submission Dates

- Submissions for the symposia are due on April 15, 1998
- Notification of acceptance will be given by May 15, 1998
- Material to be included in the working notes of the symposium must be received by August 21, 1998.

See the appropriate section in each symposia description for specific submission requirements.

Artificial Intelligence and Link Analysis

Computer-based link analysis is increasingly used in law enforcement investigations, insurance fraud detection, telecommunications network analysis, pharmaceuticals research, epidemiology, and a host of other specialized applications. Link analysis explores associations among large numbers of objects of different types. For example, a law enforcement application might examine familial relationships among suspects and victims, the addresses at which those persons reside, and the telephone numbers that they called during a specified period. The ability of link analysis to represent relationships and associations among objects of different types has proven crucial in helping human investigators comprehend complex webs of evidence and draw conclusions that are not apparent from any single piece of information.

There is both an opportunity and a need to apply AI technologies to assist human reasoning about complex networks of relationships. Potentially relevant technologies draw from work in search, semantic networks, ontological engineering, autonomous agents, inductive logic programming, graph theory, social network analysis, knowledge discovery in databases, entity-relationship modeling, information extraction, information retrieval, and

metaphor. Few of these technologies are used in current applications. Much of the current software for link analysis is little more than a graphical display tool. While visualizing networks has proven useful, many advanced applications of link analysis involve thousands of objects and links as well as a rich array of possible data models. Manual construction and analysis of such networks has proven difficult. AI technologies could be the key to enabling advanced applications.

This symposium will bring two communities into contact: members of the AI research community who currently have (or could soon develop) useful technologies; and users of link analysis techniques whose needs go beyond the capabilities of current software. (Note that the symposium will not focus on current capabilities and applications, but instead on new techniques that can be developed and deployed within 3-5 years.)

Potential participants should submit either a 5-8 page extended abstract describing a relevant AI technology or application for advanced link analysis, or a 3-5 page statement of interest outlining their expertise and potential contributions to the symposium.

Submissions and questions can be sent by electronic mail to both chairs (jensen@cs.umass.edu; henry.goldberg@nasd.com), or in hard-copy form to:

David Jensen
Computer Science Department
Box 34610 LGRC
University of Massachusetts
Amherst, MA 01003-4610, USA.

Further information can be obtained from: eksl-www.cs.umass.edu/aila

Organizing Committee

David Jensen (cochair), University of Massachusetts (jensen@cs.umass.edu); Henry Goldberg (cochair), National Association of Securities Dealers Regulation (henry.goldberg@nasd.com); William Mills, Office of Research and Development, Central Intelligence Agency; Malcolm Sparrow, John F. Kennedy School of Government, Harvard University; Katia Sycara, The Robotics Institute, CMU; Chris Westphal, Visualization Laboratory, United Information Systems; Raphael Wong, Financial Crimes Enforcement Network, U.S. Treasury Department.

Cognitive Robotics

Most current work in robotics emphasizes basic-level tasks like sensory processing, path planning, manipulator design and control, reactive agents, and artificial insects.

In contrast, research in cognitive robotics is concerned with the theory and the implementation of robots that reason, act and perceive in changing, incompletely known, unpredictable environments. Such robots must have higher level cognitive functions that involve reasoning, for example, about goals, actions, when to perceive and what to look for, the cognitive states of other agents, time, collaborative task execution, etc. In short, cognitive robotics is concerned with integrating reasoning, perception and action within a uniform theoretical and implementation framework.

Recently, cognitive robotics has attracted the interest of several research groups, and the last few years has witnessed a good deal of work on knowledge representation and especially on reasoning about actions related to actual robots.

We believe it would be very fruitful at this point to assemble researchers in this area to discuss their various results, experiences, and future goals.

The objective of this symposium is to provide a progress report for this enterprise, and hopefully to demonstrate that cognitive robotics offers a fruitful approach to the de-

sign and implementation of autonomous agents.

Submission Information

Potential participants are invited to submit either a technical paper, an overview paper on their ongoing research, a position paper, or a statement of interest. Papers should be no longer than ten pages with a font size of at least ten points. Statements of interest should be no longer than two pages. Proposal of panels on specific issues are also welcome. Your submission should be sent in PostScript format to: cogrob98@dis.uniroma1.it

Further information can be obtained from: www.dis.uniroma1.it/~cogrob98

Organizing Committee

Chitta Baral, University of Texas at El Paso (chitta@cs.utep.edu); Giuseppe De Giacomo (chair), Universita' di Roma "La Sapienza" (degiasco@dis.uniroma1.it); Kurt Konolige, SRI International (konolige@ai.sri.com); Gerhard Lakemayer, Aachen University of Technology (gerhard@informatik.rwth-aachen.de); Ray Reiter, University of Toronto (reiter@cs.toronto.edu); Murray Shanahan, Queen Mary and Westfield College (mrs@dcs.qmw.ac.uk).

Distributed Continual Planning

The increasing emphasis on real-world applications in planning research, AI as a whole, and the funding community has raised the need for distributed systems of cooperating agents for continuous planning and decision support. In the DARPA /Rome Laboratory Planning Initiative alone, researchers are developing technologies in the areas of multiagent planning architectures, distributed planning, mixed-initiative planning, distributed scheduling, and workflow management methods.

This symposium will bring together researchers from diverse fields such as classical and reactive planning, scheduling, distributed AI, and multi-agent systems to discuss issues and emerging technology for distributed, continual planning. By “distributed planning” we mean that the planning activity is distributed across multiple agents, processes or sites. By “continual planning” (or “continuous planning”) we mean that the planning process is an ongoing, dynamic process.

Relevant topics include representations and models for interagent cooperation and communication; continuous planning (managing a dynamic, asynchronous process in which planning is interleaved with execution and other related activities); technologies for distributing a planning problem, coordinating the activities of distributed planners, and merging the resulting subplans; architectures and infrastructure support for distributed planning sys-

tems; and meta-level control strategies for allocating an agent’s computational resources to support multiple tasks.

The symposium schedule will consist primarily of presentations of ongoing research by participants and focused discussion of relevant research topics. We also plan to invite guest speakers from relevant subfields such as DAI and mixed-initiative planning, and to schedule panel discussions on the relevance and utility of emerging communication and architecture standards such as KQML, CORBA, and DARPA’s Joint Task Force Reference Architecture.

Potential participants should submit either a 5-8 page extended abstract describing a relevant AI technology or application for distributed continual planning, or a 3-5 page statement of interest outlining their expertise and potential contributions to the symposium. Submissions and questions can be sent by e-mail or in hard-copy form to the chair. Further information can be obtained from: www.erg.sri.com/people/marie/dcp.html

Organizing Committee

Marie desJardins (chair), SRI International, 333 Ravenswood Avenue, Menlo Park CA 94025 (marie@erg.sri.com); Keith Decker, University of Delaware (decker@cis.udel.edu); Ed Durfee, University of Michigan (durfee@umich.edu); David Wilkins, SRI International (wilkins@ai.sri.com).

Emotional and Intelligent

The Tangled Knot of Cognition

Research in neurobiology has provided evidence that emotions pervade human intelligence at many levels, being inseparable from cognition. Perception, attention, memory, learning, decision making, social interaction, or communication are some of the aspects influenced by emotions. Their role in adaptation has likewise been evidenced by these studies. In the AI community, the need to overcome the traditional view that opposes rational cognition to absurd emotion has also been acknowledged. Emotion is not regarded anymore as an undesirable consequence of our embodiment that must be neglected, but as a necessary component of intelligent behavior that offers a rich potential for the design of artificial systems, and for enhancing our interactions with them.

This symposium investigates the role of emotions in grounding intelligent behavior, both at the individual and social levels. The main focus is on artificial agents in all sorts of embodiments, and on the possibilities for cross-fertilization between research in artificial emotions and studies of emotions in animals and humans.

Submissions are welcome regarding, among others, the following issues, in artificial or in biological systems:

- Models, architectures, and taxonomies
- Embodiment and biological aspects of emotion

- Emotion synthesis, expression, and recognition
- Emotions, adaptation, and behavior
- Emotions in cognition and learning
- Emotions in social interaction and communication
- Design and implementation issues
- Philosophical aspects
- Applications: art, autonomous and believable agents, education, entertainment, interfaces, medicine, multi-agent systems, pets and personal robots, wearable computing, etc.

Contributions from fields others than AI, ALife, and robotics (e.g., arts, biology, humanities, social sciences), are also strongly encouraged. Interaction among participants will be fostered. Discussion groups will be formed before and during the symposium. Presentations will be short and organized around panels. Poster sessions will allow for more detailed and technical discussions.

Submission Information

Potential participants who wish to present their work at the symposium should submit a short paper (up to 5,000 words) or extended abstract (1,500 to 2,500 words). Contributions should describe work in progress, completed work, positions, or give significant insight into the current state or perspectives of research in artificial, animal, or human emotions. Other potential participants should send a statement of interest (one page), briefly

describing their work and their interest in the symposium. Some of the participants will be asked to contribute a paper to the final working notes. All participants will be invited to bring a poster presenting their work. Submissions should be sent by e-mail (ASCII, UNIX compatible PostScript, or RTF) to the symposium chair:

Dolores Canamero
Vrije Universiteit Brussel (VUB)
Artificial Intelligence Laboratory
Pleinlaan 2, G-10-725
1050 Brussels, Belgium
lola@arti.vub.ac.be
arti.vub.ac.be/~lola/lola.html
Fax: +32-2-629-3729

Further information can be obtained from: arti.vub.ac.be/~lola/ei-fs98.html

Organizing Committee

Dolores Canamero (chair), Free University of Brussels - VUB, Belgium (lola@arti.vub.ac.be); Kerstin Dautenhahn, University of Reading, UK (kd@cyber.reading.ac.uk); Hiroaki Kitano, Sony CSL, Japan; Ramon Lopez de Mantaras, IIIA-CSIC, Spain; Chisato Numaoka, Sony CSL, France; Marvin Minsky, MIT, USA; Andrew Ortony, Northwestern University, USA; Rosalind Picard, MIT, USA; Takanori Shibata, MEL, Japan; Aaron Sloman, University of Birmingham, UK.

Formalizing Reasoning with Visual and Diagrammatic Representations

Visual and diagrammatic notations hold huge potential for many areas of computer science. However, since computer science has traditionally focused on sequential linguistic representations, this potential is, as yet, largely unrealized. Despite a revived and growing interest in visual representations in many fields, there is little underlying theory and methodology to support the use of such notations, because most existing research has been very application specific.

The formalization of reasoning with visual representations is an extremely difficult task, requiring a synthesis of complex representational and computational aspects as well as cognitive aspects. It can therefore serve as a touchstone for our understanding of visual representations.

The primary aim of this symposium is to strengthen the dialogue among the diverse and now largely isolated communities involved in the theory of visual representations and to merge related streams of research from the various communities, such as diagrammatic reasoning, visual language theory, qualitative spatial reasoning, and related sub-fields of HCI, logic, and linguistics.

Topics that will be covered include the following:

- *Foundational issues*: essential characteristics of visual representations, classification of visual representations, diagram understanding and

interpretation, cognitive aspects of visual processing, spatial knowledge representation

- *Formal methods*: diagram specification techniques, diagrammatic knowledge representation and inference, visual reasoning with diagrammatic languages, modeling interaction with diagrams, sound logical reasoning with diagrams, mathematics of diagrams
- *Applications*: specification of visual languages and environments, diagrammatic reasoning in AI, spatial information systems, design criteria for visual languages, tools for visual arguments or proofs, tools for visual programming

Submission Information

Papers on recent results as well as on work in progress are solicited. Survey papers are particularly invited. An extended abstract of not more than 5,000 words must be sent to bernd.meyer@acm.org or to Bernd Meyer, Ludwig Maximilians Universitaet Muenchen, Institut fuer Informatik, Oettingenstrasse 67, D-80538 Muenchen, Germany. (E-mail is preferred.) A system demonstration session centered around defined challenge tasks will be organized. Demo submissions accompanied by a one page description for the workshop notes will be due July 1.

Further information can be obtained from www.pst.informatik.uni-muenchen.de/~bmeyer/FRVDR98/

Organizing Committee

Gerard Allwein (cochair), Indiana University (gtall@phil.indiana.edu); Michael Anderson, University of Hartford; Alan Blackwell, MRC; B. Chandrasekaran, Ohio State University; Janice Glasgow, Queen's University; Volker Haarslev, University of Hamburg; Bernd Meyer (cochair), University of Munich (bernd.meyer@acm.org); Kim Marriott (cochair), Monash University (marriott@cs.monash.edu.au); Patrick Oliver, University of Wales (plo@osfb.aber.ac.uk); Atsushi Shimojima, ATR Labs.

Integrated Planning for Autonomous Agent Architectures

Recent advances in robot architectures, algorithms, sensor and effector technology have led to robust execution systems for autonomous agents. Typically, these are layered systems that either lack planning capabilities, or are interfaced in ad hoc ways to classical planning engines. This symposium seeks to investigate answers to the question: Given these robust execution systems, what existing or new planning approaches should be used with these architectures and how can they best be integrated? This symposium will bring together researchers from the intelligent robotics and AI planning communities to explore these issues.

To help generate appropriate discussion, we have identified several general areas that play a role in planning for autonomous mobile agents, and have identified the following key questions:

What is the role of planning? Do robots *need* to plan? That is, do they ever require the capabilities of today's planning systems, beyond path planning/scheduling? What exactly is meant by the term "planning" in the context of mobile robotics? What kinds of tasks require "planning"? Are these tasks important for the design of mobile robots? What is the role of specialized planners?

Communication. How should plans be communicated to the agent's execution system? How should the execution system com-

municate with the planner? How do these mechanisms effect the agent architecture?

Replanning. Is the replanning and plan fixing paradigm appropriate for mobile robots? When? What effect does replanning have on the agent architecture?

Architecture. What effect does the planner have on the structure of the executor? What effect does the executor have on the structure of the planner? For example, because robot architectures tend to "take care of details," can we return to state-based search instead of plan-based search? Can planning be incorporated without changing the functioning of the executor?

Submission Information

We seek papers on creation and integration of planning systems for mobile robots. We are especially interested in papers that look at the planning problem anew. That is, given existing robots and their architectures, should we change our approach to the planning problem? We do not want papers discussing particular planning algorithms or designs for execution systems unless they primarily discuss how these concepts provide for integration into robot systems. To ensure relevance, papers should address one or more of the topics and questions listed above. Please submit your papers by e-mail to ferrer@virginia.edu and wasson@virginia.edu.

To provide a common platform for discussion, in addition to their paper submission, each author will be expected to provide a short position paper addressing how the ideas developed in their symposium paper can be applied to one (or more) of the example domains detailed at www.cs.virginia.edu/~gjf2a/AAAI_Fall98/.

Organizing Committee

Pete Bonasso, NASA Johnson Space Center (bonasso@mickey.jsc.nasa.gov); Gabe Ferrer (cochair), University of Virginia (ferrer@virginia.edu); David Miller, KIPR (dmiller@kipr.org); Illah Nourbakhsh, Carnegie Mellon University (illah@cs.cmu.edu); Glenn Wasson (cochair), University of Virginia (wasson@virginia.edu).

Planning with Partially Observable Markov Decision Processes

Any deployed planning system must be designed to face the fact that the real world is infused with uncertainty. Partially observable Markov decision processes (POMDPs) are an elegant way of modeling uncertainty in sensing and acting, and can be used as the foundation for robust plan generation and execution. Of course, such expressiveness and mathematical elegance comes with a price; only the simplest of planning problems can be easily described and solved exactly as POMDPs.

However, the last five to ten years have seen advances in our understanding of POMDP algorithms and heuristics, improvements in the overall speed of computing, and increases in the demand for computer support for decision-making under uncertainty. Now is the perfect time to assess the POMDP approach in light of these changes, to figure out where we stand, and to plot a course for continued research and development.

The aim of this symposium is to bring together researchers who have worked in any of several key focus areas in the study of POMDPs:

- Mathematical and algorithmic foundations
- Approximations and heuristics
- Factored models
- Reinforcement learning
- Robotic applications
- Other applications
- Extensions and specializations.

Researchers will present their work in short, highly interactive, presentations, to allow all participants to form their own conception of the state of the art and the most promising directions for future research.

Submission Information

Prospective participants should send a statement of interest to Michael Littman (mlittman@cs.duke.edu) as soon as possible, but before midnight March 29th. Statement of interest should include contact e-mail address, POMDP focus area(s) as listed above, and a pointer to a paper in electronic form (e.g., URL) describing your POMDP-related work.

While new submissions are welcome, we encourage authors to point us to their existing work on this topic. Participants will be selected by the organizing committee to represent a cross-section of the growing POMDP community, with an eye toward bringing together a lively group of people.

Organizing Committee

Michael Littman (cochair), Duke University (mlittman@cs.duke.edu); Tony Cassandra (cochair), MCC (cassandra@mcc.com); Steve Hanks, University of Washington (hanks@cs.washington.edu); Leslie Pack Kaelbling, Brown University (lpk@cs.brown.edu).

Robots and Biology

Developing Connections

This symposium proposes a focused topic for discussion by a diverse group of participants. The aim is to present and promote work in the use of robot models to test biological hypotheses. We wish to attract researchers currently involved in any part of that equation: building robots; doing biological modeling; taking biological inspiration for engineering; or taking robotic inspiration for biological hypotheses. Major aims are to systematically explore when and how robots can be used in biology, when biological ideas can be applied to robotics, and what both tell us about intelligent control of behavior. Additional aims are:

- To explore problems in real-world adaptive intelligence from the perspective of biological and robotic systems
 - To foster mechanisms of communication between biology and robotics
 - To explore implementation and analysis methods for robot models of biological mechanisms
- This symposium aims to advance work in this promising field by addressing the following issues:
- How can we go from neuroethological studies to implementable hypotheses?
 - What level or levels of model-building are appropriate?
 - What are the most effective evaluation methods for these kinds of models?
 - What are the available hardware

and software mechanisms for building biological analogs, and what kind of advances in hardware and software are needed?

- What general principles for intelligent behavior are emerging from these studies?

Submission Information

Potential participants should submit a short statement (no more than two pages). Submissions should contain:

- Name, affiliation, mailing address, e-mail address, phone and fax numbers
- A summary of your previous and current work relevant to this field, with pointers to further information in published papers and/or on websites
- A list of what issues you would like to see discussed, what questions you want answered, and what connections you would like to make.

Submissions should be sent in plain text by e-mail to Barbara. Webb@nottingham.ac.uk with "Robotics and Biology: submission" in the subject line. Hard copy submissions (four copies) should be sent to

Barbara Webb
Department of Psychology
University of Nottingham
Nottingham, NG7 2RD, UK

Further Information can be obtained from: www.psychology.nottingham.ac.uk/staff/bhw/aaai.html

Organizing Committee

Randall Beer, Case Western Reserve University, (beer@alpha.ces.cwru.edu); Thomas Consi (cochair), MIT (consi@mit.edu); Holk Cruse, University of Bielefeld (holk@bio128.uni-bielefeld.de); Barbara Webb (cochair), University of Nottingham (Barbara.Webb@nottingham.ac.uk).