AAAI 1993

Fall Symposium Series
Call for Participation

October 22-24, 1993

Sheraton Imperial Hotel & Convention Center
Research Triangle Park
Raleigh, North Carolina

Sponsored by the
American Association for Artificial Intelligence
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AAAI presents the 1993 Fall Symposium Series to be held Friday through Sunday, October 22-24, 1993 at the Sheraton Imperial Hotel & Convention Center, Research Triangle Park, Raleigh, North Carolina.

The topics of the five symposia in the 1993 Fall Symposium Series are:

- Automated Deduction in Nonstandard Logics
- Games: Planning and Learning
- Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice
- Instantiating Real-World Agents
- Learning in Computer Vision: What, Why and How?

Most symposia will be limited to approximately 60 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 will be scheduled in which the highlights of each symposium will be presented, and an informal reception will be held on Friday evening, October 22.

In addition to invited participants, a limited number of other interested parties will be allowed to register in each symposium. Some student scholarship money may be available. Registration information will be available in late July 1993. To obtain it, write to the address listed on the front of this brochure.

Submission Requirements

Submission requirements vary with each symposium, and are listed in the descriptions of the symposia. Please send your submissions directly to the address given in the description. **DO NOT SEND** submissions to AAAI.

- *All submissions must arrive by* June 4, 1993.
- *Acceptances will be mailed by* July 2, 1993.
- *Material for inclusion in the working notes of the symposia must be received by* August 23, 1993.

Automated Deduction in Nonstandard Logics

A variety of nonstandard logics have been proposed in artificial intelligence to represent time, action, and various epistemic notions such as knowledge, belief, and intention. Over the past decade, a wide range of methods have been developed for performing deduction with modal logics, many-valued logics, and other nonstandard logics. Additionally, an array of methods utilizing concepts from nonstandard logic have been developed in work on nonmonotonic reasoning, abduction and belief revision.

Although many nonstandard logics and associated deduction methods have been recently proposed, a number of shortcomings characterize the current state of the field.

First, there are well-understood logics for which we do not yet have efficient deduction methods, e.g. multiple-knower epistemic logics, many nonmonotonic and conditional logics.

Second, there is a need for systematic comparison among different deduction methods, both at the level of implementation or efficiency and at the level of naturalness or expressiveness for particular domains and applications.

Third, quantitative analyses comparing the time and space requirements of nonstandard deduction algorithms are rarely to be found in the literature.

Fourth, although complexity results are available for many nonstandard logics, we still lack a sense of how frequently worst-case results will be encountered in typical applications.

Fifth, we need a convincing and well-constructed library of cases where these logics could be applied and where the performance of different deduction methods can be compared.

Finally, there are few reports of the results of building AI systems (e.g. in natural language processing) that make use of theorem provers for nonstandard logics.

These gaps are clearly related to one another in complex ways. The significance of worst-case results can only be gauged in the context of a particular application of a general proof method. Systematic comparison of different deduction methods must wait upon quantitative analyses of the various methods. Progress requires greater communication between theorem proving specialists and researchers in areas such as planning, natural language understanding and diagnosis.

The goals of the symposium are to address the various issues listed above and also to bring together researchers working on automated deduction in nonstandard logics and AI researchers interested in making use of such deductive systems. As indicated in the above issues, our interests include both theoretical concerns and the practical considerations which attach to particular implementations and applications (including performance analyses, software tools, and successful or unsuccessful case studies). In keeping with the nature of the symposium, we encourage position papers and the reporting of works in progress.

Prospective participants should submit a single page summarizing their research interests, and providing pointers to any relevant previous work. Those interested in presenting their work should instead submit an extended abstract (of at most ten pages) that describes the work.

The following are examples of possible topics:

- A theorem proving method for a nonmonotonic logic of belief.
- A system that performs deduction in a language that combines a modal logic of belief with a temporal logic.
- A description of a planner that utilizes a theorem prover for a nonstandard logic.
- Accounts of abduction and belief revision based on nonstandard logic.
- A description of an automated reasoning tool for a non-standard logic.
- Experimental results with implementation(s) of different deduction methods for modal logics.
- Theoretical discussions of the suitability of different logics (e.g. modal versus multi-valued logics) for different tasks (e.g. belief revision and natural language understanding).

Electronic submissions are preferred, and should be sent to scherl@cs.toronto.edu. Otherwise, 5 copies should be sent to:

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Invited Speaker: Melvin Fitting, Lehman College, CUNY.

Organizing Committee: Peter Jackson (cochair), Clarkson University, jackson@sandman.soe.clarkson.edu; Rich Scherl (cochair); Donald Nute, The University of Georgia; Jeff Pelletier, University of Alberta; Lincoln Wallen, University of Oxford.

Games: Planning and Learning

This symposium will provide a forum for exploring current research in AI and cognitive science that pertains to planning and learning in game playing. The symposium will draw together researchers from diverse disciplines as well as practitioners engaged in developing real game-playing systems. Relevant disciplines include AI, cognitive science, computer science, statistics, control theory, computational learning theory, economics, mathematics, engineering, and others.

Particularly welcome is research on game playing that contributes to our understanding of intelligence or is applicable to more than one game. Topics include, but are not limited to: assessing and increasing the generality of game-learning systems, computational implementations of mathematical game analysis, counterplanning, evaluation function learning, feature discovery, learning and using abstraction in game-playing, metareasoning, methodologies for evaluating learning and planning, methods amenable to broader AI problems, psychological theories and models of learning and planning in games, reasoning and planning under uncertainty, reasoning under real-time constraints, selective search, training paradigms for game-learning systems, tradeoffs between learning and planning in games, utility issues in speedup learning, interplay between AI and economic game theory in exploiting compact representations of games for learning and planning.

The symposium will maintain a balance between theoretical issues and descriptions of implemented systems to promote synergy between theory and practice. Work in areas such as tutoring and commenting—which interacts with game playing—is also welcome.

Preference will be given to completed research, but work in progress will be considered. Each submission should include a cover letter with the name, mailing address, email address, telephone number of all authors. Fax or electronic submissions will not be accepted. Printed material must be in at least ten point type with one-inch margins. Those who wish to present their work should submit six copies of a full paper, no more than ten pages in length, as well as six copies of a one-page statement of their relevant research interests and their related publications. Those who wish to attend without presenting work should submit six copies of a one- page statement of their relevant research interests and their related publications. All submissions should be addressed to:

Robert Levinson
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Program Committee: Murray Campbell, Susan Epstein (cochair), Nicholas Flann, Richard Korf, Robert Levinson (cochair), Barney Pell, Stuart Russell, Prasad Tadepalli, Gerald Tesauro, Paul Utgoff.

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Human-Computer Collaboration: Reconciling Theory, Synthesizing Practice

This symposium deals with the theory and practice of collaborative problem solving between people and computers. The study of collaborative problem solving involves understanding the processes by which agents work together to achieve goals. We seek a deep understanding of this process as it occurs between one human and one computational agent, an understanding that takes into account the unique characteristics of each type of agent. In particular, the goals of this workshop are to explore the fundamental nature of collaborative problem solving, to examine various approaches to modeling collaboration and designing collaborative systems, and to draw lessons from implemented systems.

We have identified three major issues that we would like submissions to address: (1) effectively sharing responsibility for accomplishing a task between a person and computer, (2) managing the interaction between a person and computer, and (3) clarifying assumptions concerning the cognitive capabilities and knowledge requirements required for effective collaboration. Each of these issues has a number of sub-issues which are listed below.

1. Sharing Responsibility

- *Analyses of the strengths and weaknesses of people and computers.* Such analyses form the basis for distributions of responsibility between people and computers that maximize the effectiveness of the "joint cognitive system."
- *Analyses of the types of communication and coordination necessary to collaborate on a task,* such as delegating responsibility for particular aspects of the task, reporting results in a timely fashion, and evaluating results.
- *Analyses of how people do work.* For example, studies that show people interleave problem-solving with problem-setting or that they create personalized workspaces to organize task-relevant objects and partial solutions have major implications for system design.
- *Methods for shifting responsibility between people and computers.* As people use a system, they may detect routines in their work or patterns of failure and repair interactions; users should be able to tell the system about such regularities and shift some of the burden for managing them to the system. On the other hand, as users' skills increase, they may want to assume greater responsibility.

2. Managing Interaction

- *Models of interaction.* Two major

models are *intermediary* and *model world*. An intermediary interface mediates between a user and an application, and communication occurs via linguistic description. A model world interface uses iconic displays and direct manipulation to give users the experience of direct engagement with objects in the domain of interest. We are interested in analyses of the conditions under which each model is most appropriate and ways in which they may be integrated.

• *Managing multi-media interaction*. We are interested in analyses of which media are best for expressing particular types of information and techniques for coordinating the presentation of related information in different media. We also seek comparisons of linguistic and non-linguistic methods for presenting information.

• *Achieving natural communication*. Issues such as managing trouble and controlling initiative are crucial to effective interaction, whatever modalities are used.

3. Clarifying Assumptions

• *What knowledge must a system have in order to be an effective collaborative partner?* For example, are models of a user's goals and plans necessary? What about models of the task domain?

• *What are appropriate architectures for deploying this knowledge?* How does the debate between "planned" and "situated" accounts of activity affect the design of collaborative problem solving systems?

We are interested in both theoretical arguments concerning the type of knowledge that is necessary to be an effective collaborative partner, and system-based arguments that identify types of knowledge that have proved useful in practice, examine the cost of acquiring, representing, and utilizing such knowledge, or present general architectures for collaborative behavior.

Those wishing to participate should submit six copies of a position paper to the committee chair by email. Papers that report on empirical studies of collaborative problem solving, theories of collaboration, and system architectures, implementations, and evaluations are all of interest. Papers should be no longer than ten pages and should be as short as possible. We seek papers that take clear positions, make crisp claims, even aim to provoke controversy, rather than simply present a description of a system, model, or study.

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Program Committee: Gerhard Fischer, University of Colorado at Boulder; Lewis Johnson, USC / ISI; Johanna Moore, University of Pittsburgh; Chuck Rich, Mitsubishi Electric Research Laboratories; Candace Sidner, Digital Equipment Corporation.

Instantiating Real-World Agents

Rather than being centered on a research area, or a general unsolved problem area (e.g., intelligent agents), this symposium will concentrate on one specific real-world problem in the hopes that progress can be made on at least this problem, and that a solution to this specific problem will provide clues to solutions to the more general problems.

This symposium will concentrate on AI as applied to a physically instantiated robot for vacuuming household floors. The target problem is to autonomously vacuum your living room, while doing the right thing with furniture, pets, trash, etc. In particular, research on navigation, planning, spatial representation, multi-agent control, behavior control, obstacle avoidance, perception, exploration, NLP interfaces, etc., will be of interest as long as they are related to household vacuuming. Theoretical work, simulations, and implemented systems will all be of interest. However, work presented at this symposium should be set in the target domain.

Limiting the discussions to a specific task to be performed without allowing the engineering of a specific solution still leaves a plethora of issues to be explored. We hope that significant progress can be made on this problem, and that new research methods might grow out of this type of symposia. Perhaps most importantly, we are hopeful that a common problem domain may obviate the vocabulary problems that have crept up in recent years when researchers involved in different problems try to talk to one another. By having a common problem, we hope a common language will emerge.

Additionally, by concentrating on a real-world problem domain, we hope that some practical progress can be made in this domain, and in the related research areas. Robotics and planning work are too often detached from their application areas. It is hoped that this workshop will bring to focus some research areas that are of more than just academic interest. It may even be possible that participants in this symposium will work on a commercial version of this robot— allowing them to really clean up!

Potential participants for the symposium on Instantiating Intelligent Agents should submit a short position paper (2–6 pages) that describes either their approach towards addressing the vacuuming problem, or their current research and how it can be related to the floor vacuuming problem.

Pete Bonasso
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Organizing Committee: Pete Bonasso, MITRE, cochair and contact person (bonasso@starbase.mitre.org); David Miller, JPL, cochair; Ramesh Jain, UCSD; Ben Kuipers, University of Texas at Austin.

Machine Learning in Computer Vision: What, Why, and How?

This symposium will bring together researchers from different specialties in machine learning and computer vision to address issues raised by examining the use of machine learning in computer vision:

- What elements of a computer vision system might be learned rather than hand-crafted by the designer?
- What machine learning paradigms are appropriate to the computer vision domain (espe-

cially across the signal to symbol transition)?

- Why or how would learning improve the performance or efficiency of computer vision systems?
- How do we go about implementing or exploiting the machine learning paradigms which seem most appropriate to the computer vision domain?

One of the acknowledged problems with computer vision systems is that they tend to be hand-crafted application-specific efforts that embody or reflect rather little in the way of general principles which can adapt easily from one application environment to another. While some in the computer vision are currently reconsidering the goal of general purpose vision systems as possibly too difficult or not relevant, there is still the clearly motivated desire to learn something from the experience in creating a vision system for one application domain that can be used to make it easier to create the vision system.

Since much of the effort in creating a vision system often lies in creating a database of examples and facts, and in tuning the parameters and operations of the system to the application domain, learning techniques may be of use in addressing this problem. However, it is not yet clear what learning capabilities computer vision systems should have, why these capabilities should result in computer vision systems that display greater competence and generality, or how to go about building vision systems that incorporate learning capabilities.

From the standpoint of machine learning systems, visual domains present some interesting problems. The images and outputs of low-level image processing operations tend to be noisy, making it difficult to get true segmentation of images. Thus it is unreasonable to assume that the transition from image signal to symbol is made completely and correctly. Also, large numbers of exactly labeled examples suitable for inductive learning are generally not available. Some domain knowledge and clear examples are often available suggesting a multiparadigm learning approach.

Format: The symposium will contain both invited and submitted papers. There will be several longer talks by invited experts and a number of short talks. We will emphasize an interactive discussion of issues. One panel will be held on the obstacles to applying learning to vision and promising approaches. Panel suggestions are encouraged and may be given to any program committee member. There will be a poster session to encourage broad participation and discussion.

To present a paper or poster, submit an extended abstract of three to five pages by email (ascii, latex or postscript) to: hall@csee.usf.edu or kwb@csee.usf.edu or by hard copy to:

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To attend the workshop without presenting, send a supporting note.

Program Committee: Kevin Bowyer, University of South Florida, cochair; Chris Brown, University of Rochester; Bruce Draper, University of Massachusetts; Lawrence Hall, University of South Florida, cochair; Tom Mitchell, Carnegie-Mellon University; Dean Pomerleau, Carnegie-Mellon University; Larry Rendell, University of Illinois.